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FAO TECHNICAL GUIDELINES FOR RESPONSIBLE FISHERIES

4

Suppl. 2 Add. 2

FISHERIES MANAGEMENT

2. The ecosystem approach to fisheries

2.2 The human dimensions of the ecosystem approach to fisheries

FIAT PANIS

Cover photograph:
A woman collects salted fish at a fishing village, Pante Raja Barat, Pante Raja subdistrict in Pidie, Indonesia (FAO/A. Berry).

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Rome, 2009

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PREPARATION OF THIS DOCUMENT

These Guidelines have been finalized by the Fisheries and Aquaculture Economics and Policy Division (FIE) and Fishery and Aquaculture Management Division (FIM) of the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations based on the draft outline developed during the Expert Consultation on the Economic, Social and Institutional Considerations of Applying the Ecosystem Approach to Fisheries Management, Rome, Italy, 6–9 June 2006.

The participants in the Expert Consultation were: Angel Alcala, Gabriella Bianchi, Kirsten Bjøru, Juan Carlos Castilla, Anthony Charles, Kevern Cochrane, Cassandra De Young, William Emerson, Nicole Franz, Ndiaga Gueye, Bjørn Hersoug, Antonia Hjort, Alastair Macfarlane, Sebastian Mathew, Patrick McConney, Magnus Ngoile, Alessandra Pomè, Ramiro Sanchez, Juan Carlos Seijo, Merle Sowman, Ussif Sumaila, Jon Sutinen, John Ward and Rolf Willmann. On the basis of a comprehensive background document prepared by Cassandra De Young, Anthony Charles and Antonia Hjort, the Consultation provided its comments and proposed amendments to the text of the background document. This document then served as the basis for the preparation of these Technical Guidelines, for which the Consultation developed a detailed outline and the first draft of which was prepared by Anthony Charles, Cassandra De Young, Patrick McConney and Merle Sowman. Comments on the draft were received from Gabriella Bianchi, Cecile Brugère, Francis Chopin, Patrick Christie, Kevern Cochrane, Nicola Ferri, Ari Gudmundsson, Blaise Kuemlangan, James Muir, Jean-François Pulvenis de Séligny, Neil Ridler, Anniken Skonhoft and Rolf Willmann. Lena Westlund was responsible for the revision of the Guidelines.

The Consultation also recommended that a more comprehensive technical paper be prepared as a companion document to the guidelines (FAO Fisheries Technical Paper No. 489).[1]

The Guidelines have been prepared with the support of FishCode, FAO's umbrella programme for implementation of the Code of Conduct for Responsible Fisheries.

These Guidelines should be read as a supplement to the FAO Technical Guidelines on Fisheries Management (No. 4, FAO, Rome, 1997, 82p.) and

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[1] De Young, C., Charles, A. and Hjort, A. 2008. Human dimensions of the ecosystem approach to fisheries: an overview of context, concepts, tools and methods. *FAO Fisheries Technical Paper.* No. 489. Rome, FAO. 152p.

on the Ecosystem Approach to Fisheries (No. 4, Suppl. 2, FAO, Rome, 2003, 112p.). While both these Guidelines were structured in similar ways, this document follows a different outline in order to allow for emphasis on the social, economic and institutional aspects. However, links to these previous Guidelines have been made explicit throughout the document.

These Guidelines have no formal legal status and are intended to provide support for the implementation of the FAO Code of Conduct for Responsible Fisheries (the Code or CCRF). Furthermore, in order to present the management process in all its complexity and diversity, the wording and structure of these Guidelines do not strictly follow the language and the structure of the Code. Therefore, any eventual differences in the terminology employed should not be understood as an intention to reinterpret the Code. In addition, these Guidelines should be considered as preliminary, to be revised as the EAF concept evolves and as additional practical experience becomes available.

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Fisheries management. 2. The ecosystem approach to fisheries. 2.2 Human dimensions of the ecosystem approach to fisheries.
FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 2, Add. 2. Rome, FAO. 2009. 88p.

ABSTRACT

These Guidelines have been developed in response to requests for further information on the practical adoption and application of the ecosystem approach to fisheries (EAF), with a special focus on its human dimensions. As implementation of EAF is a human pursuit and takes place in the context of societal goals and aspirations, the human forces at play need to be understood and considered. These are manifest in a variety of ways and include policies, legal frameworks, social structures, cultural values, economic principles, institutional processes and any other relevant form or expression of human behaviour. In summary, the human dimensions play the following four roles in EAF:

1. social, economic and institutional objectives and factors are driving forces behind the need for EAF management;
2. the costs and benefits to individuals and to society of applying the EAF have social, economic and institutional impacts and implications;
3. the application of social, economic and institutional instruments are all crucial for successful implementation of the EAF; and
4. social, economic and institutional factors present in fishery systems can play either supporting or constraining roles in EAF implementation.

Although the need for ecosystem-based approaches has reached a point of general acceptance by those involved in fisheries and their management, there remains in some quarters a sense of frustration at the management and policy levels regarding how the EAF should be applied in practice. Some questions that can occur are: "Is there a standard approach to EAF and what are the common paths?"; "What are the EAF information needs?"; "What are the EAF costs and benefits and how are different issues assessed and prioritized? "What mechanisms and approaches exist that would assist in the implementation of EAF?"; "What is adaptive management and how are indicators used in EAF?"; "How can an EAF be sustained in the longer term?"; "Are there special requirements with regard to developing countries and when implementing EAF in a poverty context?"; and "How is EAF implemented in practice – what are the different steps and activities?".

These Guidelines supplement the existing guidelines on EAF (FAO, 2003) and attempt to provide further insight into these questions.

The first part of the Guidelines discusses an overview of the EAF process and context – the social, economic and institutional driving forces for starting an EAF, the motivations for embarking on an EAF process, the definition of its boundaries and scale, the socioeconomic context relevant to EAF and the sources and processes for collecting and using relevant information for ensuring that the main strategic components are adequately considered in the EAF process.

The second part of the Guidelines reviews in more detail some of the key concepts and components relevant to EAF – the use of social, economic and institutional mechanisms and incentives in the EAF process, adaptive management and the use of indicators for dealing with the reality of uncertainty, the longer-term aspects and how to sustain an EAF, and a reflecting on special requirements of developing countries and considerations with regard to implementing EAF in a poverty context.

The third part looks into the steps for planning and implementing an EAF in practice. Drawing on the discussions in the earlier chapters and in the EAF Guidelines, the EAF process is reviewed from a practical perspective step by step: (i) initiation and preparation; (ii) identification of issues and policy formulation; (iii) setting of operational objectives and development of a management plan; (iv) EAF implementation; and (v) monitoring and evaluation.

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Acronyms and abbreviations

BCLME	Benguela Current Large Marine Ecosystem
CBA	Cost-benefit Analysis
CBD	Convention on Biological Diversity
CCLMRAR	Commission for the Conservation of Living Marine Resources of the Antarctic Region
the Code	Code of Conduct for Responsible Fisheries
COFI	Committee on Fisheries
DFID	Department for International Development
EA	Ecosystem approach
EAF	Ecosystem approach to fisheries
EAM	Ecosystem approach to management
EBFM	Ecosystem-based fishery management
EEZ	Exclusive economic zone
ESD	Ecologically Sustainable Development
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
HIV/AIDS	Human immunodeficiency virus/acquired immunodeficiency syndrome
IM	Integrated Management
LME	Large Marine Ecosystem
MCS	Monitoring, control and surveillance
MDGs	Millennium Development Goals
MPA	Marine protected areas
PES	Payment for environmental services
PGIS	Participatory geographic information systems
RASF	Risk Assessment for Sustainable Fisheries
SDRS	FAO Sustainable Development Reference System
SFLP	Sustainable Fisheries Livelihood Programme
SLA	Sustainable Livelihoods Approach
TAC	Total allowable catch
TROM	Target-resource oriented management
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNGA	United Nations General Assembly
VMS	Vessel monitoring system
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

EXECUTIVE SUMMARY

These Guidelines have been developed in support of the implementation of the Code of Conduct for Responsible Fisheries (the Code) and in response to requests for further information on the adoption and application of the ecosystem approach to fisheries (EAF), with a special focus on its human dimensions, i.e. social, cultural, economic, political and institutional processes and factors. Since EAF is a human pursuit, human dimensions have to receive adequate attention when planning and implementing EAF and the purpose of these Guidelines is to provide support with regard to how to put EAF into practice. They supplement the *EAF Guidelines* (FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2)[2] and the initial FAO Technical Guidelines for Responsible Fisheries No. 4, Fisheries management. The target audience of the guidelines includes fisheries managers, decision makers, researchers, leaders of fishing communities, stakeholders in industry as well as others involved in the development and implementation of EAF.

The document is divided into three parts, in addition to the introductory chapter:

In the Introduction, main features of the EAF concept and its institutional foundation are recalled. The underlying principles of EAF are not new; they are rooted in a number of international instruments and agreements dating back to the Declaration of the UN Conference on the Human Environment ("Stockholm Declaration" in 1972 and the UN Convention of the Law of the Sea (UNCLOS) adopted in 1982. The EAF adheres to the principles agreed on in the 1992 UN Conference on Environment and Development (UNCED) and subsequent initiatives with regard to sustainable development. The ecosystem principles, concerns and policy directions contained in the provisions of the Code provide the framework for EAF. EAF is also closely linked to other approaches in the field of development, natural resource and spatial area management, e.g. the Sustainable Livelihoods Approach (SLA) and Integrated Management (IM).

The EAF takes its focus in fisheries management but broadens the perspective beyond seeing a fishery as simply "fish in the sea, people in boats", beyond consideration only of commercially-important species and beyond management efforts directed solely at the harvesting process. As defined in the *EAF Guidelines*, an EAF strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries. The purpose of an EAF is to

[2] Similar guidelines on the ecosystem approach to aquaculture (EAA) are being produced.

plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by the aquatic ecosystems.

Part I gives an overview of the EAF process and context. Part I, Section 1 provides some insight into the social, economic and institutional driving forces for starting an EAF and discusses its starting points and paths. More often than not, EAF is implemented as an incremental process, building on existing fisheries management systems. The paths will hence be situation specific and the EAF implementation process tends to be iterative, although centered around the main steps of policy formulation, development of a management plan, implementation, and monitoring and evaluation. The information and lessons learned through the monitoring and evaluation process will feed back into the policy and management plans, and lead to modifications to any of the previous processes through an adaptive management approach.

Part I, Section 2 looks into the different components of the fishery system, the boundaries and scale of an EAF and its socio-economic context. In order to accurately incorporate and capitalize on the human dimensions relevant to an EAF, the fishery system, defined in coherence with the scale and boundaries of the EAF, its components from "hook to cook" and its context, need to be understood and considered, including, *inter alia*:

- the stakeholders, their different goals and aspirations, and the power relations between different groups;
- the aquatic ecosystem services and how they are valued by stakeholder groups and society
- the legal, policy and institutional frameworks; and
- the socio-economic context of the fishery system, including employment and livelihoods, the economic status of the fisheries, trade and global markets, distributional and equity issues, poverty and vulnerability, and gender.

Part I, Section 3 discusses the sources and processes for collecting relevant information for ensuring that the main strategic components are adequately considered in the EAF process. It should be stressed that EAF is about improving decision-making and implementation of fisheries management in an ecosystem context and it may not require detailed information on how the ecological, social, economic or institutional systems work, although reducing uncertainties by increasing knowledge will, in general, improve implementation. Analogous to the precautionary approach, lack of data should not be a reason for delaying the start of an EAF but low-cost information approaches (i.e. relying on best available information) may have to be applied as opposed to high-cost information approaches (i.e.

scientific, research intense). There are diverse sources knowledge systems for EAF information, including traditional knowledge, local knowledge and scientific knowledge.

Part II reviews in more detail some of the key concepts and components relevant to EAF. In Part II, Section 1, methods for assessment and prioritization of issues within the EAF context are discussed and the use of cost-benefit analyses, risk assessment and distributional impact reviews as part of the EAF planning and implementation process is brought up. The benefits generated by the ecosystem may change when management evolves from conventional fisheries management practices – or no management – to EAF. EAF managers need to understand what these changes are and how they compare with the costs of implementing EAF and this information needs to be communicated to stakeholders to underpin the decision-making process. Risk assessment is a practical approach for evaluating and selecting different policy and management options. Also crucial in EAF management, as elsewhere, is an understanding of the distributional impacts involved, i.e. who benefits and who does not, as well as how the costs and benefits occur over time and over space. Such distributional impacts need to be understood and appropriately taken into account in order for EAF management to succeed.

Part II, Section 2 outlines how social, economic and institutional mechanisms and incentives can be used in the EAF process. The change in fisheries management policy that the introduction of EAF entails is likely to require changes in legal frameworks; an enabling legal framework is fundamental to the successful implementation of EAF. It should provide for the establishment of EAF management plans and clearly designate the institutions responsible for implementing and enforcing such plans.

An EAF is also likely to require fundamental changes in the institutional arrangements governing fisheries management. These changes need to address, *inter alia*:

- incorporation of additional uncertainties into the EAF decision-making processes due to the increase in factors causing such uncertainties;
- mechanisms for effectively involving the broadened definition of stakeholders in decision-making and management, including definition of roles and responsibilities, and mechanisms for conflict management;
- provisions for devolution of authority, e.g. decentralized decision-making and management responsibilities, to allow for allocation of rights and set-up of co-management systems, as required; and

- increased coordination, cooperation and communication within and among relevant institutions and resource user groups, in the fishery sector and outside.

While enforcement of conventional fisheries management practices has often centred around negative incentives in the form of regulations with penalties for non-compliance, recent trends and the development of EAF suggest increased use of positive incentives to encourage the desired behaviour of fishery system and ecosystem actors. In addition to grouping incentives as positive or negative, they can also be grouped into four categories based on the nature of the incentive itself: institutional, legal, economic and social incentives. Which type of instrument that should be used will depend on the local situation and the goals and objectives that have been set. There are also so called perverse incentives, which are, from an EAF point of view, any policy or management measures that incite people or groups to act in a way that negatively impacts on an ecosystem's ability to provide sustained services or, in other words, that lead to unsustainable or inefficient use of ecosystem resources. Logical reasoning would suggest the abolishment of existing perverse incentives as a critical step to EAF management.

Closely related to incentives is the potential need to develop new livelihoods and employment opportunities. When fishers and communities have few if any economic alternatives and fishing effort needs to be reduced or constrained, it will be very difficult to institute effective fishery and ecosystem management, since the impacts of fishery decisions may be unacceptably severe.

Part II, Section 3 discusses adaptive management and the use of indicators. A fundamental consideration that must be dealt with in fisheries management – and so possibly even more when applying EAF – is the reality of uncertainty. The precautionary approach is acknowledged as a key underlying basis for incorporating uncertainty into decision-making. Adaptive management is also an approach that directly acknowledges uncertainty in decision-making processes. Adaptive management takes the view that resource management policies can be treated as "experiments", whether actively or passively, from which managers can learn and then adapt or change. To make the process effective, it is essential that the "experiments" and their results are appropriately documented. In this way, the use of adaptive management and learning processes will allow EAF systems to adjust and improve over time as new experiences and knowledge become available.

In order to use effectively an adaptive management approach, there is a need for a robust monitoring system providing information on the performance of the various components of the EAF policy and management system. There is, hence, a need to define and agree on indicators, reference

points and performance measures. Indicators are needed at different levels and stages of the EAF process and should be defined for goals, objectives and processes relevant to EAF policy, management plan and implementation. These are best formulated within a suitable integrated framework and following a logical process, such as the sustainable development reference system (SDRF).

Part II, Section 4 examines the longer-term aspects and how to sustain an EAF. Sustaining conventional fisheries management practices has often proven challenging in terms of:

- maintaining political commitment to difficult, sometimes long-term, courses of action;
- enabling legislative frameworks to support changing management measures; and
- ensuring adequate financing for the management system.

These and other challenges can increase considerably with the adoption of an EAF due to the comparatively larger set of interests, issues, actors, and institutions. The long-term sustainability of the EAF has to be given due attention early on in the EAF planning and implementation processes.

In order to guarantee a strong and sustained political commitment, it is essential that policy-makers be aware of the benefits and needs of an EAF, as well as the concerns of their constituents in this respect; for that reason, it is important to ensure that the public and stakeholders, including special interest groups, are also well aware of the benefits and needs of sustaining an EAF.

The legal framework needs to be flexible and responsive to various changes, including changes in the knowledge base and changes to the biological, ecological and socio-economic systems. At the same time, it needs to be robust enough to provide stability. In the case of transboundary ecosystems, there could be a need for harmonizing legislation among involved countries or provinces.

An EAF needs to have long-term funding in order to be sustained. Generalizing, there are three main sources for funding EAF: (i) from the state treasury, through the budget allocations to the fishery agency responsible for EAF coordination and management, and by contributions from other relevant government entities involved in the process; (ii) from internal cost-recovery mechanisms such as "user pays" or "polluter pays"; and (iii) from external funding. In practice, an EAF is likely to draw on a combination of these funding sources.

Part II, Section 5 reflects on the special requirements of developing countries and how EAF can be implemented in a poverty context. The contribution of small-scale fisheries to poverty alleviation and food security is significant and the sector also often plays an important role in poverty

prevention in many developing countries. There may be limited incentives for community members, particularly poorer groups, to participate in EAF and other participatory management arrangements if they mean less fish production today in exchange of benefits in a distant future. Hence, in the context of small-scale fisheries and poverty, an approach to create the necessary conditions and incentives to ensure an equitable participation of stakeholders in an EAF and at the same time address poverty is to embed the EAF management in a broader development context.

The key points and issues highlighted in Parts 1 and 2 are that:

- **EAF takes its focus in fisheries management but broadens the perspective** to include elements of the ecosystem – including its human components – together with the core fishery. EAF is an integrated approach to fisheries management, striving to balance diverse societal objectives, with its basis in the FAO Code of Conduct for Responsible Fisheries.
- **EAF is a human pursuit** and human beings, their objectives, their behaviour and their institutions, are key to successful implementation of EAF.
- **An EAF can be started at different levels and by the initiative of different stakeholders:** the motivations for starting an EAF process and the paths into this process are multiple and vary according to the local context. More often than not, EAF is implemented as an incremental process, building on existing fisheries management systems.
- **The fishery system** – i.e. the social-ecological system surrounding the fishery that is at the core of the EAF – **is the starting point for defining the scope of the EAF**. An EAF puts the fishery in a context of three main facets: its biotic components, its abiotic elements and its human dimensions, including social, economic and institutional frameworks and factors.
- **The definition of the EAF boundaries and scale needs to take social, economic and institutional boundaries into consideration together with non-human ecosystem boundaries**. The human scales may be different from those of the resource or the harvesting (fishing) activity and management may be required at different scales and imply cross-scale linkages.
- **Priority initial activities and outputs of an EAF process** include identifying stakeholders, and establishing an understanding of their needs and goals and of how different stakeholder groups value and prioritize ecosystem services. Existing policy, institutional and legal frameworks need to be reviewed and taken into account together with

the realities of the socioeconomic context in which the EAF is implemented.

- **EAF does not require, *per se*, detailed information** on how the ecological, social, economic or institutional systems work, although reducing uncertainties by increasing knowledge will improve implementation. Analogous to the precautionary approach, **lack of data should not be a reason for delaying the start of an EAF**.
- With **broad based stakeholder participation and a fishery system perspective**, a wide variety of issues will be identified for inclusion in the EAF. These **issues need to be prioritized** and a number of methods exist for, among other things, assessing costs and benefits, analysing risks and reviewing distributional impacts. The use of analytical frameworks that allow for informed participatory decision-making is an important element of the EAF policy and management plan development process.
- **Good governance should guide EAF management**. Appropriate institutional arrangements, an enabling legal framework, effective stakeholder participation and capacity development, incentives and the adoption of a sustainable livelihoods approach are key ingredients in a successful EAF process.
- **Adaptive management** based on an effective monitoring and evaluation system – including well-defined performance indicators – is essential for addressing uncertainties and allowing for experience and lessons-learnt to feed into the EAF process and improve performance and outcomes.
- **EAF is a long-term process** and continued political commitment, legal flexibility and harmonization and adequate funding is essential for its success.
- Introducing EAF in developing countries with limited capacities may prove particularly challenging. **Special care is needed when designing and implementing EAF in a poverty context** in order to ensure participatory processes and equitable outcomes.

Part III looks into the steps for planning and implementing an EAF in practice. Drawing on the discussions in the earlier chapters and Technical Guidelines No. 4 and No. 4, Suppl. 2, the EAF process is reviewed from a practical perspective step by step, i.e.: (i) Initiation and preparation (Part III, Section 2); (ii) Identification of issues and policy formulation (Part III, Section 3); (iii) Setting of operational objectives and development of a management plan (Part III, Section 4); (iv) EAF implementation (Part III, Section 5); and (v) Monitoring and evaluation (Part III, Section 6).

Part III, Section 7 concludes this document by noting that the current paradigm shift toward EAF will require time to take full effect as well as the development and application of new approaches and methodologies.

BACKGROUND

1. From ancient times, fishing has been a major source of food for humanity and a provider of employment and economic benefits to those engaged in this activity. However, with increased knowledge and the dynamic development of fisheries, it was realized that living aquatic resources, although renewable, are not infinite and need to be properly managed, if their contribution to the nutritional, economic and social wellbeing of the growing world's population was to be sustained.

2. The adoption in 1982 of the United Nations Convention on the Law of the Sea provided a new framework for the better management of marine resources. The new legal regime of the oceans gave coastal States rights and responsibilities for the management and use of fishery resources within the areas of their national jurisdiction, which embrace some 90 percent of the world's marine fisheries.

3. In recent years, world fisheries have become a dynamically developing sector of the food industry, and many States have striven to take advantage of their new opportunities by investing in modern fishing fleets and processing factories in response to growing international demand for fish and fishery products. It became clear, however, that many fisheries resources could not sustain an often uncontrolled increase of exploitation.

4. Clear signs of over-exploitation of important fish stocks, modifications of ecosystems, significant economic losses, and international conflicts on management and fish trade threatened the long-term sustainability of fisheries and the contribution of fisheries to food supply. Therefore, the Nineteenth Session of the FAO Committee on Fisheries (COFI), held in March 1991, recommended that new approaches to fisheries management embracing conservation and environmental, as well as social and economic, considerations were urgently needed. FAO was asked to develop the concept of responsible fisheries and elaborate a Code of Conduct to foster its application.

5. Subsequently, the Government of Mexico, in collaboration with FAO, organized an International Conference on Responsible Fishing in Cancún in May 1992. The Declaration of Cancún endorsed at that Conference was brought to the attention of the UN Conference on Environment and Development (UNCED) Summit in Rio de Janeiro, Brazil, in June 1992, which supported the preparation of a Code of Conduct for Responsible Fisheries. The FAO Technical Consultation on High Seas Fishing, held in September 1992, further recommended the elaboration of a Code to address the issues regarding high seas fisheries.

6. The One Hundred and Second Session of the FAO Council, held in November 1992, discussed the elaboration of the Code, recommending that priority be given to high seas issues and requested that proposals for the Code be presented to the 1993 session of the Committee on Fisheries.

7. The Twentieth Session of COFI, held in March 1993, examined in general the proposed framework and content for such a Code, including the elaboration of guidelines, and endorsed a time frame for the further elaboration of the Code. It also requested FAO to prepare, on a "fast track" basis, as part of the Code, proposals to prevent reflagging of fishing vessels which affect conservation and management measures on the high seas. This resulted in the FAO Conference, at its Twenty-seventh Session in November 1993, adopting the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, which, according to FAO Conference Resolution 15/93, forms an integral part of the Code of Conduct for Responsible Fisheries (CCRF).

8. The Code was formulated so as to be interpreted and applied in conformity with the relevant rules of international law, as reflected in the United Nations Convention on the Law of the Sea, 1982, as well as in a manner consistent with the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995, and in the light of, inter alia, the 1992 Declaration of Cancún and the 1992 Rio Declaration on Environment and Development, in particular Chapter 17 of Agenda 21.

9. The development of the Code was carried out by FAO through an exhaustive process of negotiation involving all members of the Organization as well as the active participation of representatives of other international organizations, including relevant United Nations Agencies and other international non-governmental organizations.

10. The Code of Conduct consists of five introductory articles: Nature and Scope; Objectives; Relationship with Other International Instruments; Implementation, Monitoring and Updating and Special Requirements of Developing Countries. These introductory articles are followed by an article on General Principles, which precedes the six thematic articles on Fisheries Management, Fishing Operations, Aquaculture Development, Integration of Fisheries into Coastal Area Management, Post-Harvest Practices and Trade,

and Fisheries Research. As already mentioned, the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas forms an integral part of the Code.

11. The Code is voluntary. However, certain parts of it are based on relevant rules of international law, as reflected in the United Nations Convention on the Law of the Sea of 10 December 1982. The Code also contains provisions that may be or have already been given binding effect by means of other obligatory legal instruments amongst the Parties, such as the Agreement to Promote Compliance with Conservation and Management Measures by Fishing Vessels on the High Seas.

12. The Twenty-eighth session of the Conference in Resolution 4/95 adopted the Code of Conduct for Responsible Fisheries on 31 October 1995. The same Resolution requested FAO, *inter alia,* to elaborate appropriate technical guidelines in support of the implementation of the Code in collaboration with members and interested relevant organizations.

13. The concepts and principles of an ecosystem approach to fisheries (EAF) are not new. Their roots may be found in a number of international instruments and agreements that include:

- the 1972 Declaration of the United Nations Conference on the Human Environment ("Stockholm Declaration");
- the 1982 United Nations Law of the Sea Convention;
- the 1992 Rio Declaration and Agenda 21 adopted by the United Nations Conference on Environment and Development (UNCED);
- the 1992 Convention on Biological Diversity;
- the 1995 United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks ("UN Fish Stocks Agreement", UNFSA); and
- the 1995 FAO Code of Conduct for Responsible Fisheries.

14. An essential step was taken in 2001 with the adoption of the FAO Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem, which, among others, requested that FAO prepare "...guidelines for best practices with regard to introducing ecosystem considerations into fisheries management".

15. Even more recently, the World Summit on Sustainable Development (WSSD) (Johannesburg, South Africa, 2002) adopted a Political Declaration and a Plan of Implementation in relation to capture fisheries, ecosystem health and the conservation of biodiversity. In the Declaration, the Heads of

States agreed to: "develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive practices, the establishment of marine protected areas ... and the integration of marine and coastal areas into key sectors" (31c).

16. In 2003, the FAO published its Technical Guidelines for Responsible Fisheries: Fisheries management. 2. Ecosystem approach to fisheries (No. 4, Suppl. 2, FAO, Rome, 2003, 112p.) as an attempt to translate the requests for an ecosystem approach into operational guidelines that can be applied to fisheries management. At the twenty fifth session of COFI in 2003, the FAO was commended on the EAF technical guidelines and COFI suggested that FAO, through case studies on small-scale fisheries, develop a toolbox supporting the EAF, containing rapid appraisal techniques, participatory processes, conflict resolution, methods of integrated resource assessment and management, including co-management, and capacity-building.

17. In furthering this work, COFI suggested including clearer definitions of the EAF terminology, evaluation of its legal implications, better analysis of social and economic objectives, development of ecosystem-related indicators, reference points and decision rules, and deeper analysis of bio-ecological issues. It was also stressed that in undertaking these activities fishers should be seen as integral component of aquatic ecosystems, taking into account the social and economic impacts of applying the EAF.

18. At the Twenty sixth Session of COFI in 2006, it was noted that there still needs to be greater understanding on how the EAF should be applied in practice. The current guidelines endeavour to deepen our understanding of the role that human dimensions (i.e. social, cultural, economic, political and institutional processes and factors) should play in the implementation of the EAF. These guidelines encompass both inland and marine fisheries and are relevant to large-scale, small-scale, recreational and aquarium fishing in both developing as well as developed economies.

19. As is the case for the *EAF Guidelines*, this document should be read as a supplement to the FAO Technical Guidelines for Responsible Fisheries: Fisheries management (No. 4, Rome, 1997, 82p.).

INTRODUCTION

Why guidelines on the human dimensions of the EAF?

The need for ecosystem-based approaches has reached a point of general acceptance by those involved in fisheries and their management, and calls for an ecosystem approach to fisheries (EAF) have increased noticeably. It is recognized that an ecosystem approach is fundamental to the implementation of the FAO Code of Conduct for Responsible Fisheries (hereafter referred to as "the Code"), providing a way to achieve sustainable development in the fisheries context.

Following the 2003 FAO Technical Guidelines on the EAF,[3] this document has been developed in response to requests for further information on the practical adoption and application of the EAF, with a special focus on its human dimensions. As implementation of EAF is a human pursuit and takes place in the context of societal goals and aspirations, the human forces at play need to be understood and considered. These are manifest in a variety of ways and include policies, legal frameworks, social structures, cultural values, economic principles, institutional processes and any other relevant form or expression of human behaviour.[4] In summary, there are four "entry points" of human considerations in EAF:

- social, economic and institutional objectives and factors are driving forces behind the need for EAF management;
- the costs and benefits to individuals and to society of applying the EAF have social, economic and institutional impacts and implications;
- the application of social, economic and institutional instruments and mechanisms are all crucial for successful implementation of the EAF; and
- social, economic and institutional factors present in fishery systems can play either supporting or constraining roles in EAF implementation.

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[3] FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. *FAO Technical Guidelines for Responsible Fisheries* No. 4, Suppl. 2. 112p. Hereafter referred to as the *EAF Guidelines*.

[4] The different components of the human dimensions (i.e. social, cultural, economic, political and institutional processes and factors) will from here on commonly be referred to as social, economic and institutional.

Although the EAF by definition includes social, economic and institutional considerations,[5] it is still seen in some quarters – in spite of the intentions – as a predominantly biological and ecological concept and there is still a need for a better understanding of its other components. An integrated interdisciplinary approach to EAF is required and many, although not all, of the questions that often arise with regard to EAF implementation are in effect related to human aspects, such as: "Is there a standard approach to EAF and what are the common paths?"; "What are the EAF information needs?"; "What are the EAF costs and benefits and how are different issues assessed and prioritized?; "What mechanisms and approaches exist that would assist in the implementation of EAF?"; "What is adaptive management and how are indicators used in EAF?"; "How can an EAF be sustained in the longer term?"; "Are there special requirements with regard to developing countries and when implementing EAF in a poverty context?"; and "How is EAF implemented in practice – what are the different steps and activities?".

These Guidelines seek to answer these questions and bridge the gap between the need to pay more attention to the human context of the ecosystems within which fisheries operate and the reality that human beings, their objectives, their behaviour and their institutions are key to successful implementation of the EAF and the Code. Bluntly speaking, without due consideration to the human dimensions, EAF cannot be successful.

Why do we need to pay attention to the human dimensions of EAF?

- *If we do not pay attention to the human aspects, EAF will fail, in the same way that conventional management has often failed.*
- *If we do not understand why people do or do not do things, even policies, legal frameworks and management plans with the best intentions will be filled with unintended consequences or will not be followed at all.*

[5] There exist different interpretations of the term *ecosystem*. EAF is based on an understanding of ecosystems as social-ecological systems including humans and their actions as well as the biophysical components (see Glossary).

The EAF: history and rationale

Institutional foundation

The EAF emerged from the convergence of two important paradigms: conservation and fisheries management. Conservation focuses on the protection of the natural environment, whereas fisheries management mainly aims to sustainably harvest a resource to meet societal and economic needs. Supported by the concept of sustainable development, EAF builds on the recognition of the interdependence between ecosystem health and human well-being. The approach is also motivated by the increased understanding of fishery-ecosystem interactions and by the poor performance of conventional fishery management approaches. The principles, concerns and policy directions contained in the provisions of the Code provide a framework for EAF.

Hence, the concepts and principles of the EAF are not new. They are contained in a number of international instruments, agreements and conference outputs, in addition to the Code, that have been negotiated during the last few decades. The two main international roots of EAF – as well as the Code – are the 1972 Declaration of the UN Conference on the Human Environment (the "Stockholm Declaration") and the UN Convention on the Law of the Sea (UNCLOS) adopted in 1982. In 1992, the UN Conference on Environment and Development (UNCED) emphasized both the importance of placing people at the centre of concerns and of the sustainable exploitation of resources. The Rio Declaration on the principles of sustainable development, and Agenda 21 which contained extensive provisions for the seas and oceans and their management, were adopted in 1992. The Convention on Biological Diversity (CBD) was also signed, elaborating the core principles of multiple-use biodiversity management and leading to the adoption in 1995 of the ecosystem approach (EA) as the primary action framework under the Convention. A number of international events have followed, including the adoption of relevant United Nations General Assembly (UNGA) resolutions (e.g. 61/105 and 61/222), which have contributed to the progressive emergence of the EAF and related paradigms.

Linked to the UN and international agenda are a myriad of national and regional efforts and initiatives to apply a more holistic approach to fisheries management and to safeguard ecosystems. Parallel initiatives also exist within other sectors, such as forestry and tourism; all contributing to international efforts toward sustainable development approaches and practices. In the context of oceans, examples of cross-sectoral approaches include ecosystem-based fishery management (EBFM), implemented by, for example, the United States Pacific Fisheries Management Council, the ecosystem approach to management (EAM) undertaken by the Commission

for the Conservation of Living Marine Resources of the Antarctic Region (CCLMRAR), the fisheries ecosystem management framework contained in the Australian national strategy on ecologically sustainable development (ESD) and the Large Marine Ecosystem (LME) management initiatives. There are similarities in the overarching principles and objectives of the various approaches to natural resource management, but there are also differences in the scope and emphasis (see Box 1).

EAF is also closely linked to other approaches in the field of development, natural resource and spatial area management, e.g. the Sustainable Livelihoods Approach (SLA) and Integrated Management (IM). These approaches are complementary to EAF, and indeed there is a substantial overlap in terms of their underlying principles, philosophy and methods.

Box 1

Ecosystem approaches for natural resource management – Similarities and differences in starting points and focuses

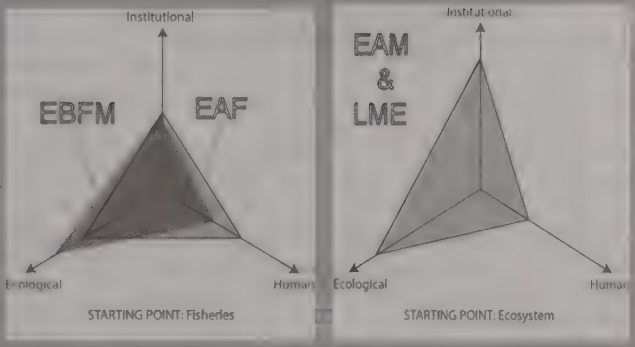
Differences are found among the many ecosystem approaches to natural resource management being implemented by different organizations around the world today. It is difficult to quantify these nuances or to provide a scale on which the approaches could be placed. One notable distinction that could be made refers to whether the process starts from a fisheries perspective or from a more holistic ecosystem overview. EAF and EBFM have their focus in fisheries management while, for example, the EAM and LME approaches tend to start from a defined ecosystem in which fisheries is one sector among several others.

Another distinction that could be made concerns the discipline-centred perspective of the different approaches:

- Institutional - governance aspects including cross-sectoral coordination and collaboration;
- Human – socio-economic well-being and attainment of economic societal objectives; and
- Ecological – health of biological ecosystem components and environmental sustainability.

Box 1 (cont.)

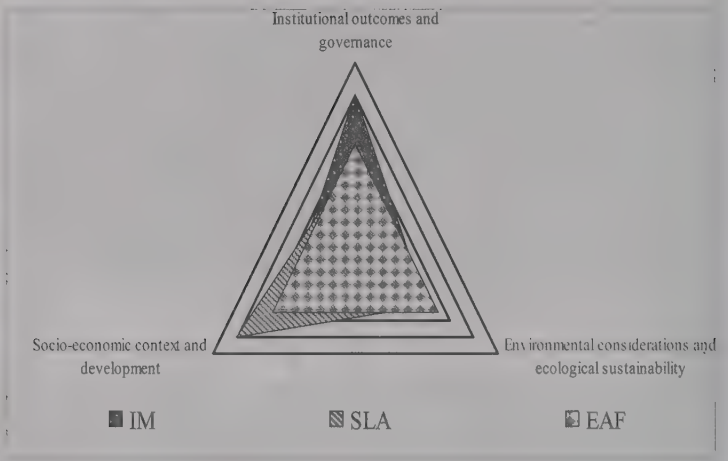
In line with their ecosystem based starting point and holistic outlook, EAM and LME generally have a stronger explicit focus on ecological and - particularly with regard to LME - institutional aspects than the fisheries based approaches EAF and EBFM. Comparing EAF and EBFM, the latter could be regarded as relatively more inclined toward ecology than the former that seeks to balance human and societal economic needs with ecological functions. The figures below attempt to illustrate these nuances in focus and perspective.



Sources: Bianchi, G. 2008. The concept of ecosystem approach to fisheries in FAO. *In: The ecosystem approach to fisheries*. Bianchi, G. and Skjoldal, H.R. (eds). 2008. CABI Publishing, United Kingdom.
Christie, P., Fluharty, D.L., White, A.T., Eisma-Osorio, L. and Jatulan, W. 2007. Assessing the feasibility of ecosystem-based fisheries management in tropical contexts. *Marine Policy* (31): 239-250.

Using three similar discipline-defined perspectives as applied on the ecosystem approaches for natural resource management in Box 1, these overlaps and differences are illustrated in Figure 1.[6]

[6] For a more detailed comparison, see: The ecosystem approach: issues, terminology, principles, institutional foundations, implementation and outlook (*FAO Fisheries Technical Paper* No. 443, 2003); and Human dimensions of the ecosystem approach to fisheries: an overview of context, tools and methods (*FAO Fisheries Technical Paper* No. 489, 2008).



Sources: see footnote 6

Figure 1. Overlaps and relative focus of major natural resource and spatial area management approaches

Principles and definition

The EAF takes its focus in fisheries management but broadens the perspective beyond seeing a fishery as simply "fish in the sea, people in boats", beyond consideration only of commercially important species, and beyond management efforts directed solely at the fish harvesting process. EAF requires the inclusion of interactions between the core of the fishery – fish and fishers – as well as other elements of the ecosystem and the human system relevant to management. EAF is aligned with the more general ecosystem approach (EA)[7] but is mainly bounded by the ability of fisheries management to implement the EA(F). However, this should not be seen as downplaying the fisheries sector's responsibility in collaborating in a broader multisectoral application of the EA:

> *The purpose of an EAF is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by the aquatic ecosystems.*

[7] See Glossary.

> *An ecosystem approach to fisheries (EAF) strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries (EAF Guidelines, page 6).*

The EAF is not inconsistent with or a substitute for conventional fisheries management approaches but intends to improve their implementation and reinforce their ecological relevance with a view to contributing to achieving sustainable development.

Accordingly, an EAF should address the following principles:

- Governance should ensure both human and ecosystem well-being and equity.
- Fisheries should be managed to limit their impact on the ecosystem to the extent possible.
- Ecological relationships between the fishery resources targeted and harvested by a fishery and those species dependent and associated with these resources should be maintained.
- Management measures should be compatible across the entire distribution of the fishery resource, i.e. in the whole area where it exists, including across jurisdictions and management plans if required.
- The precautionary approach should be applied because the knowledge on ecosystems is incomplete.

EAF is hence an extension of the conventional fisheries management paradigm[8] allowing for a broader and more holistic approach to analysis and management actions. In conceptual terms, this may appear fairly clear but in practice, the exact shape and magnitude of this extension will vary from one situation to another since existing fisheries management systems range widely from basically free and open access to more elaborate multispecies and/or rights-based management frameworks.

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[8] In medium- and large-scale commercial fisheries, the dominant fisheries management paradigm during the last several decades has been so-called target-resource oriented management (TROM), focusing mainly on the stock of the target species. However, many small-scale, multispecies fisheries are undertaken with little intervention beyond development support, or are based on more traditional management systems. The term "conventional fisheries management" will be used in this document referring to the global situation, in which TROM is a part.

Figure 2 gives a simplified schematic overview of the EAF context and Table 1 provides some examples of the shift in focus EAF entails. The concept of "fishery system" is explored in Part I, Section 2.

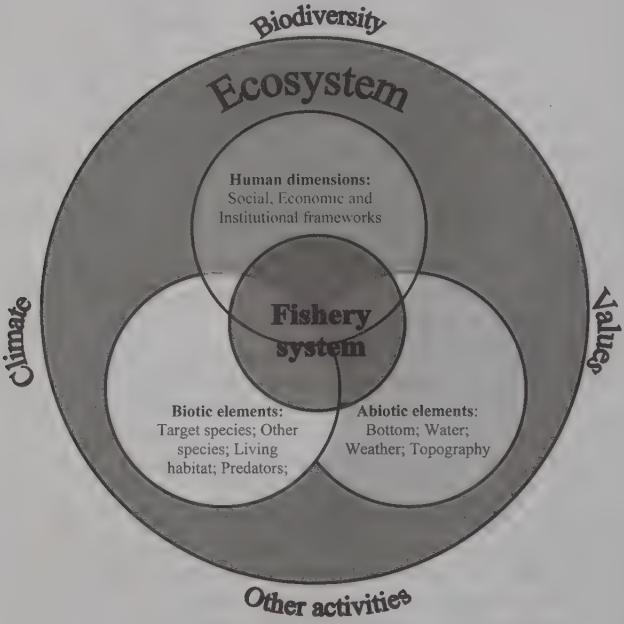

Figure 2. EAF components

Table 1. Moving towards EAF – Examples of the shifting focus

Conventional fisheries management	EAF
Stakeholders are those directly or indirectly involved in fishing activities	Stakeholders are found throughout the fishery system and in other sectors of the ecosystem
Management commonly by government fisheries authority (top-down)	Participation and co-management with a broad spectrum of stakeholder groups
Operates through regulations and penalties for non-compliance	Compliance to regulations is encouraged through incentives
Single-species (or target-resource) management	Multispecies and broader ecosystem management
Focus on the fishery	Focus on the broader fishery system
Indicators related to fish catches and status of fish stock	Indicators related to all parts of the aquatic ecosystem and goods and services
Scientific knowledge is the only valid knowledge for decision-making	Traditional, local, and scientific knowledge systems may be used for decision-making

What analytical advantages does EAF provide?

By its holistic approach and use of a fishery system perspective, EAF provides a systematic framework that helps to ensure that all relevant components and as broad a set of issues as possible are considered and analysed. Not all initially identified issues may be dealt with in the EAF – because they have been determined low priority at the given moment – but the EAF promotes a methodological and transparent process for analysing and prioritizing issues and concerns.

Purpose and structure of these Guidelines

These Guidelines have been developed in support of the implementation of the Code and intend to provide guidance with regard to how to put EAF into practice focusing on the different roles the human dimensions play in planning and implementing EAF. Although prepared as a stand-alone document, the Guidelines should be read as a supplement to the *EAF Guidelines* and the initial FAO Technical Guidelines for Responsible Fisheries No. 4, *Fisheries management.*[9] It should be noted that while the *EAF Guidelines* and the *Fisheries Management Guidelines* were structured in similar ways, this document follows a different outline in order to allow for emphasis on the social, economic and institutional aspects.

There are also two complementary background and information papers providing more detail on many of the concepts and practical application aspects:

- The ecosystem approach: issues, terminology, principles, institutional foundations, implementation and outlook (*FAO Fisheries Technical Paper* No. 443, 2003);
- Human dimensions of the ecosystem approach to fisheries: an overview of context, tools and methods (*FAO Fisheries Technical Paper* No. 489, 2008).

References to these documents and other material are given throughout the text of this document, as and when relevant.

The Guidelines apply in particular to capture fisheries in inland and marine waters but many of the concepts and processes described are relevant to any aquatic resources management framework embracing a holistic, integrated and participatory approach. Their target audience includes fisheries managers, decision-makers, researchers, leaders of fishing communities, stakeholders in industry as well as others involved in the development and implementation of EAF.

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[9] FAO. 1997. Fisheries management. *FAO Technical Guidelines for Responsible Fisheries* No. 4. Rome, FAO. 82p., from here on referred to as the *Fisheries Management Guidelines*. There is also a simplified version of the *EAF Guidelines*, *Putting into practice the ecosystem approach to fisheries* (FAO. 2005. Rome, FAO. 76p.). The 2008 Best practices in ecosystem modelling for informing an ecosystem approach to fisheries (*FAO Fisheries Technical Guidelines for Responsible Fisheries* No. 4, Suppl. 2, Add. 1. Rome, FAO. 78p.) provides additional guidance.

PART I – OVERVIEW OF THE EAF PROCESS AND ITS CONTEXT

1. EAF – HOW DOES IT START AND WHAT ARE THE DIFFERENT STEPS?

1.1 Motivations for initiating an EAF

While there is considerable general agreement on the need for EAF, specific action has to be taken to implement the approach in practice. The *EAF Guidelines* points out this requirement to translate EAF principles into case-specific objectives and activities to make EAF operational.[10] However, first of all, the EAF process needs to be initiated. Managing fisheries is a human activity and the choice to start or proceed toward an EAF process will be based on a human decision. But who makes the decision to start EAF and what are the driving forces?

EAF initiatives can be started at various levels and by different stakeholder groups, ranging from, for example, a community or stakeholder wanting to address specific concerns or an environmental group concerned about biodiversity conservation, to a government or group of governments deciding to widely implement EAF in a national or regional fisheries policy framework. Concerns that current fishery and environmental management frameworks are inadequate are likely to be a significant driving force, but the origin could also be a specific event that requires action, e.g. increased pollution or natural disasters. It could also be related to a more general political commitment or the signing of, for example, multilateral agreements committing national or local fisheries authorities to an intersectoral process.

1.2 The EAF process

As with most endeavours, EAF requires an initial stage of preparation and initiation. While a fisheries department or other fishery management authority may make the general initial decision and assume the role of EAF coordinator and manager,[11] buy-in at an early stage from key stakeholders is essential. Considering the integrated approach required for EAF, intersectoral working arrangements need to be quickly put in place. It is essential to have a multidisciplinary team – including interdisciplinary and communication skills – involved from the start.

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[10] See Chapter 1.4 of the *EAF Guidelines*.

[11] When referring to the lead person or agency for an EAF, which will in most cases be a government fisheries management authority, the terms *EAF coordinator* or *EAF manager* are used in this document.

There is no standard approach to developing and implementing EAF. Nevertheless, the overall EAF process would include a number of defined components. The process of developing an EAF management plan is described in the *EAF Guidelines*[12] and it is similar in structure to conventional fisheries management practice of planning, setting objectives, and monitoring and assessing performance (see Box 2).

Box 2
Components of the EAF process

After completion of the *initial preparatory phase*, covering overall definition of the EAF scope and scale, identification of main stakeholders and the broad issues to address as well as compilation of background information, the EAF process includes:

- *identification of issues* needing to be managed and formulation of *EAF policy;*
- *development* of an *EAF management plan* and related objectives;
- *implementation* of the EAF; and
- *EAF monitoring and evaluation.*

These components of the EAF process are reviewed in more detail in Part 3 of this document.

The paths into EAF vary widely and there is no single starting point. The process may be initiated at the point of any of its components. More often than not, EAF is an evolutionary process, building on existing fisheries management and developing step by step in accordance with context specific needs and desires. EAF can occur at the level of a riparian fishing community or be implemented in the high seas. In any case, it should be an iterative process with information and lessons learnt from monitoring and evaluation feeding back into policy and management plans, leading to modifications of any of the previous components and the EAF process hence tends to be a circular flow of actions (see Figure 3).[13]

[12] See Chapter 4 Management processes of the *EAF Guidelines*. When discussed in this document, the EAF process has been divided into somewhat differently defined components than in the *EAF Guidelines* in order to allow for more detailed discussions on the issues relevant to this publication. Nevertheless, the overall rationale and sequence remain the same (see also Part III).

[13] See also Part II, Section 3 on Adaptive management.

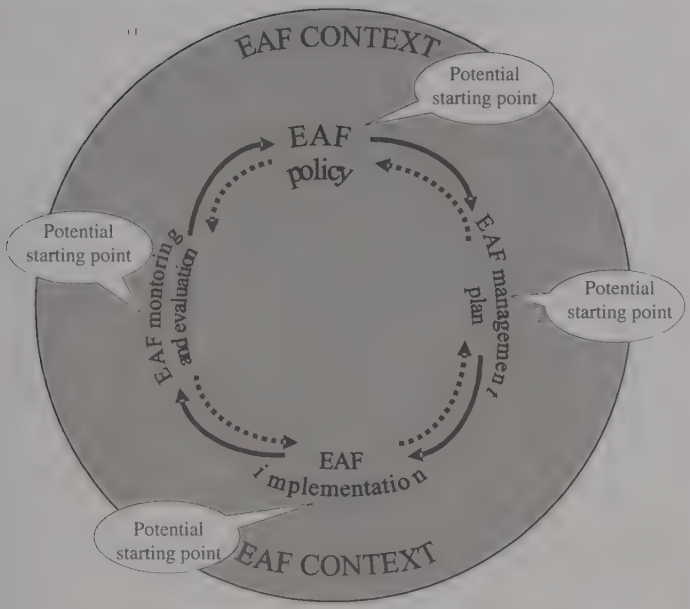
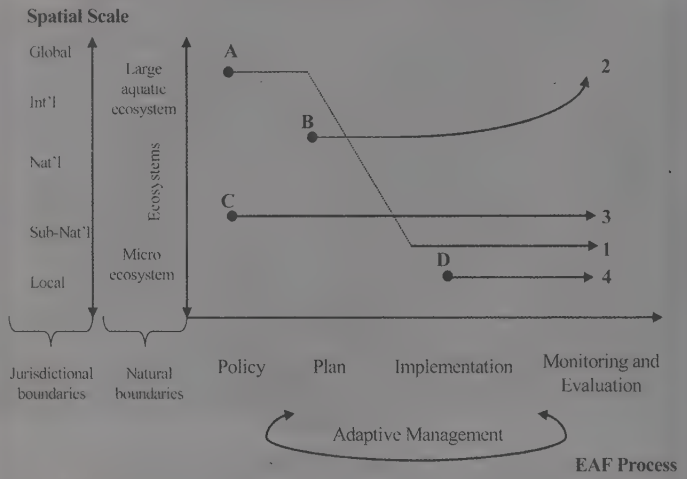


Figure 3. The EAF process and its starting points

In some situations, the EAF may start reactionary in dealing with emergency issues, rather than as a complete forward looking process beginning at the policy stage: the EAF is initiated by a specific local problem leading to the use of a technical fix, such as introduction of turtle excluder devices or establishment of marine protected areas (MPAs). However, the experience of developing locally appropriate solutions, perhaps through an inclusive and participatory process, and the increased understanding gained from having to react to wider issues may trigger a more holistic and comprehensive approach to EAF application to the point of rethinking a fisheries or aquatic ecosystem policy and, by consequence, fisheries management. Box 3 presents a few examples paths that may arise from these various starting points, including possible changes of boundaries and scale for context-specific EAFs.

Box 3
Example EAF paths

The initiation of an EAF may take place at various stages of the EAF process, may target different scales and may evolve differently along the EAF path. The following figure presents four example starting points (A to D) and paths (1 to 4) of EAF initiation and implementation.



Path A1: Starting from an international commitment to define aquatic resource policy at the level of an LME, leading to integrated natural resource management planning at this level; however, implementation of these plans occurs at the national level (within marine areas under national jurisdiction, including EEZ), with subnational adaptations of fisheries management plans within the internationally defined policies and plans.

Path B2: Starting from the revision of existing fisheries management at the national-level to incorporate EAF principles and approaches, leading to a subregional agreement amongst two or more nations to adopt an EAF for shared or transboundary aquatic resources.

Path C3: Starting with national policy revisions to incorporate an EAF, leading to more holistic, integrated and participatory approaches to managing waters in the territory of a country, including inland waters, following EAF principles, including fully functioning monitoring and evaluation mechanisms, and adaptive management.

Path D4: Starting as a response to a crisis within the fishery such as a bycatch problem in a single fishery that is corrected by a technical measure (e.g. a turtle exclusion device); potentially leading to a revision of policy and management within this fishery and elsewhere that incorporates EAF principles.

2. UNDERSTANDING THE HUMAN DIMENSIONS OF THE EAF CONTEXT

2.1 The fishery system: the starting point for defining the scope of the EAF

The *EAF Guidelines* explain that EAF encompasses broader economic, social and ecological considerations than conventional fisheries management.[14] EAF broadens fisheries perspectives beyond the conventional focus on "fish and fleets", placing the fishery in a context of three main components - biotic, abiotic, and human - in a manner compatible with a "systems" approach to the fishery (see Figure 2). The fishery system is a social-ecological system, and consists of linkages between people and the environment, also outside the actual fishing operations.

The fishery system's components of particular interest to these guidelines are stakeholders and their needs and aspirations, and the associated policy, legal and institutional frameworks. These exist in a socio-economic context and are linked by societal and cultural values. Some components will be at the core of the system (e.g. fishers as primary stakeholders and local fisheries management regulations) while others are more peripheral (consumers of fish products, environmentalists and legal frameworks). Within the fishery system there is a vital flow through a "supply chain" or "fish chain" that takes the fish caught from the sea *via* the post-harvest sector and on to the markets and the consumers - the "hook to cook" sequence. All these aspects need to be incorporated into the broader approach of EAF management.

However, a balance needs to be struck between the need for a broad perspective, yet avoiding excessive costs or overextending existing management capabilities. For any given fishery, the idea is to determine which components of the fishery system (resource, ecosystem boundaries, post-harvest activities, community institutions, other resource users, etc.) and what issues need to be incorporated to make EAF management effective. In Part II, Section 1, the process of prioritizing issues to be covered in an EAF is further discussed.

2.2 Boundaries and scales

Once the decision to adopt an EAF is made, determination of the appropriate spatial boundaries and scale of the EAF will be among the necessary first decisions. The scale of a fishery system can vary greatly and ecosystems are not always clearly defined entities with unambiguous

[14] See Chapter 1.4 of the *EAF Guidelines*.

boundaries. The final choice of fishery(ies) and geographic area for an EAF will depend on the broader issues identified but a preliminary delineation of the area concerned is necessary, if only to allow identification of main stakeholders. Hence, in practice, these initial activities of the EAF process should be considered preliminary and interactive (see also Part III, Section 1).

Depending on the local situation and the rationale behind the EAF decision, the spatial boundaries may already be established, reflecting the spatial jurisdiction of a country or a regional fisheries body, or coinciding with natural physical boundaries (see Box 3). In other situations, these may no longer be appropriate and there will be a need to expand them to include the essential ecosystem components. Moreover, EAF management may involve different spatial scales for dealing with the different case-specific system components from a governance and administrative point of view (see Box 4).[15]

2.3 Identifying stakeholders

People are, of course, the core of the human dimensions of EAF and the identification and involvement of stakeholders are central to EAF. Understanding their values, needs, aspirations, and current livelihood circumstances, is key to informing policy and influencing management decisions. Involving stakeholders throughout the EAF process engenders process ownership and increases the likelihood of successful and sustained results.

A stakeholder analysis needs to be included as a key undertaking in any EAF process. Stakeholder analysis goes beyond identifying stakeholders toward determining their level of interest and respective association with the resources and issues under consideration. The stakeholder analysis should give a picture of who needs to be a partner and/or consulted in the EAF process and whose interests are too remote for this to be necessary. Not all stakeholders have the same stake and level of interest in resource management issues and different stakeholder may thus choose to be more or less involved at different stages in the consultation process.

[15] See also Chapter 4.1.2 in the *EAF Guidelines*.

Box 4

Defining the boundaries and the scale of an EAF

Management of any system requires the specification of its boundaries. Determining appropriate boundaries for an EAF is a challenging task. The challenge is compounded by having to mesh together biophysical ecosystem boundaries with social, economic and institutional boundaries. Management units could be defined to reflect biological stock units and oceanographic realities, or on the basis of human factors to reflect, for example, the cohesive nature of a fishing community (e.g. social networks) or political realities (e.g. jurisdictional boundaries). The factors that are of greatest importance in setting boundaries are likely to vary depending on the context.

The question of scale is important in three ways in relation to EAF management:

- First, it is important to understand whether the many social, economic and institutional considerations in implementing the EAF vary depending on the scale of the fishery and its system (e.g. local, national, regional, or even broader scale), and in what manner.
- Second, in implementing the EAF it will be important to address the challenges in managing fisheries in which human (social, economic and institutional) scales are different from that of the resource, or that of the harvesting (fishing) activity.
- Third, management of a given fishery may be required at multiple scales, and this may involve a process of "scaling up" or "scaling down". For example, if fisheries management is already implemented at a broad geographical scale (e.g. state, province or nation), it may be necessary to scale management down to work at a local level. Equally, where local-level or community-based management systems are in place within local ecosystems, it may be necessary to scale them up in order to allow for spatial heterogeneity and differing human and institutional arrangements. These situations imply a need for possible "cross-scale linkages".

Box 5
Who are the EAF stakeholders?

In the context of EAF, stakeholders can be defined as individuals, groups, organizations, or associations, that are involved in, have interest in, or are affected (positively or negatively) by, fisheries resource use and ecosystem management. Stakeholders may include groups affected by policy and/or management decisions, groups concerned about policy and/or management decisions, groups dependent upon fisheries resources for their livelihood, groups with claims over the area or resources, groups engaged in activities that impact upon an area or resource (e.g. oil companies, aquaculture) as well as those who have special interests in the area or resources (e.g. recreational divers, research community, environmentalists).

Stakeholder analysis is also an important analytical tool for promoting transparency. It seeks to understand relationships and power dynamics (see Box 6) and gives indications of where potential future conflicts might occur between stakeholder groups, allowing for taking mitigating measures at an early stage. Failure to identify and involve all relevant groups can lead to conflict later in the management process and can require costly interventions to resolve problems.[16]

[16] The *FAO Fisheries Technical Paper* No. 489 on the human dimensions of EAF includes further discussions on different aspects of stakeholder involvement and its Annex refers to some of the tools that are relevant in this context.

Box 6
Understanding power relations and dynamics

Power differences might exist among stakeholder groups, e.g. between large industrial companies and small-scale fishers, or between different social groups within a fishing community, or between democratic versus authoritarian or modern versus traditional leadership structures. Such power dynamics often determine the willingness of stakeholders to participate in policy and management processes relevant to EAF management. Uneven power relations (whether perceived or real) are likely to result in limited or skewed involvement by relevant stakeholders, with the result that certain interests are not represented and decisions may lead to inequitable outcomes. Hence, understanding power relations is important to allow for effective participation of different stakeholder groups in the EAF process.

Signs that indicate uneven power relations include:

- patronage, which perpetuates powerlessness of vulnerable groups by maintaining dependency rather than increasing self-reliance;
- political manipulation and co-optation by powerful forces, including fisheries authorities;
- lack of accountability or mandates of representatives;
- assumptions that a move toward equity can be achieved without empowerment and capacity building;
- representation and pursuance of individual interests rather than the interests of society or resource users;
- frequent infractions of the rules that remain uncontrolled; and
- lack of clearly defined use and management rights.

2.4 Understanding societal goals and values

Closely related to stakeholder identification is the requirement to comprehend their needs and aspirations, which are generally reflected in societal values and goals. These reflect shared understandings among groups of people (e.g. a nation, a small community, a group of resource users) of what is good, desirable and just, and what they aspire to and hope for.

It is these values and broad goals of society that provide the context for fisheries governance, policies, management systems, research directions and regulations, and that will also inform EAF policy formulation. However, while overarching societal goals may be broadly enshrined in a country's constitution and various policies that inform fisheries legislation and management systems, this does not mean that there is always broad consensus on these laws and systems. In reality, society comprises a heterogeneous mix of people and groupings with different values and goals.

Thus, when formulating policy and determining appropriate management strategies and plans for EAF, it may not be possible to reflect a consensus position that fully incorporates the goals and values of all groupings involved in the fishery system. There are most likely to be elements of winning and losing and certainly the need to arrange for tradeoffs. The process hence needs to be participatory, transparent and adequately documented to allow stakeholder groups to understand why certain choices have been made. The formulation of EAF policy is further discussed in Part III, Section 3.[17]

2.5 Human values of ecosystem services

In order to assess choices and prioritize among different options with regard to EAF policy goals and objectives, the services that ecosystems provide to humans need to be understood. The ecosystem services can be grouped into four different categories:[18]

- *Provisioning services* include the products that can be obtained from the ecosystem, e.g. food (fish), fuel, genetic resources, pharmaceuticals and freshwater.
- *Regulating services* comprise ecosystem processes related to water quality, biological controls, climate, etc.
- *Cultural services* cover what people can obtain in the form of spiritual enrichment, recreation, aesthetic experience and other non-material benefits.
- *Supporting services* are those needed to produce the other ecosystem services; their impact on people is either indirect or occurs over a long time period.

The different services have values to individuals and societies. Every time a decision is made regarding an activity that is relevant to an ecosystem, it will influence the stream of services provided by the natural system and, either directly and indirectly, human welfare. EAF managers need to understand the various ways in which different groups of stakeholders are affected by decisions and how they value the concerned services.

It is a difficult task because of the variety of ecosystem services provided and the vast array of values and stakeholders. A first step towards understanding these values would include the involvement of stakeholders in order to determine the matrix of ecosystem services potentially affected

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[17] A process for developing objectives from principles and societal goals is described in Chapter 4 of the *EAF Guidelines*.

[18] Millennium Ecosystem Assessment. 2003. *Ecosystems and Human Well-Being A Framework for Assessment.* Island Press. 212p.

by EAF management actions. Including a broad range of stakeholders helps to define the holders of values, from the local to global scales, and to provide a comprehensive understanding of the potential services related to specific ecosystems (see also Parts II, Section 1 and III, Section 4).[19]

2.6 Legal, policy and institutional frameworks

Societal goals and values influence policy and are reflected in policy, legal and institutional frameworks. As seen above, the EAF concepts and principles are contained in a number of international instruments and agreements. There is also a number of regional, national and local frameworks relevant to EAF. It is important for the EAF manager to understand what these frameworks are, how they affect the EAF process and what changes are required for enabling the implementation of an EAF.

An EAF can only be implemented successfully within the context of an effective over-arching framework for management. Key policy concepts relevant for the EAF management framework and with implications on the institutional arrangements needed include:

- the precautionary approach;[20]
- effective stakeholder participation;
- fishery and ecosystem management approaches, including the allocation of management and use rights; and
- coordination and intersectoral interactions.

Good governance is a basic requirement for the framework as a whole.

These EAF policy concepts and their implications for institutional and legal arrangements are further discussed in Part II, Section 2.[21]

2.7 The socio-economic context

Understanding socio-economic and demographic characteristics of the fishery system is necessary in order to identify context-appropriate management approaches. Some relevant aspects of the socio-economic EAF context are reviewed below.

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[19] More information on ecosystem services and assessment methods is provided in Chapters 3 and 6 of the *FAO Fisheries Technical Paper* No. 489 on the human dimensions of EAF and in the *EAF Guidelines* (e.g. see Annex 3 on Economic valuation).

[20] See FAO. 1996. Precautionary approach to capture fisheries and species introductions. *FAO Technical Guidelines for Responsible Fisheries*. No. 2. Rome, FAO. 1996. 54p.

[21] Legal and institutional aspects are also discussed in Chapter 4.2 of the *EAF Guidelines*.

2.7.1 Employment and livelihoods

The contribution of fisheries to employment and livelihoods varies considerably between and within countries. The introduction of EAF is likely to affect, in both positive and negative ways, this part of the national economy. Changes may be expected in, for example, existing employment patterns and income levels of fishery participants and other resource users, the skills base of employees, and the degree of dependence on the fishery or ecosystem. These factors should, where possible, be quantified and considered prior to implementing EAF.

Changes to fishing operations resulting from the implementation of EAF are likely to extend beyond simply impacting on employment and fishers' livelihoods. Due to indirect impacts on the commodity supply chain and the linkages within the fishery system, other socio-professional groups and subsectors will also be affected. These might include supply side inputs to the fishing operation through "upstream" activities, such as: (i) investments (e.g. vessels, engines and gear); (ii) operational costs (e.g. fuel, ice, food, bait, labour costs); and (iii) maintenance costs, and "downstream" activities post-harvesting (e.g. processing and marketing). Similar impacts may exist for other resource users, for example, in the tourist sector.

2.7.2 Economic status of the fisheries

To be able to assess the potential economic impacts of management decisions, EAF managers need to have an understanding of the economic structure and health of the various economic subsectors of the fishery system. With regard to fishing operations, the following aspects, *inter alia*, need to be understood:

- motivations for entry into the fishery (could be dominated by "push" factors, i.e. there are no or few alternative economic occupations for the local population, or "pull" factors, i.e. there is money to be made in the fishery and this attracts new entrants);
- whether profits or economic rent are being maximized;
- the extent to which the fishery is dependent on subsidies or other forms of assistance; and
- whether the fishery comprises a large number of small vessels owned by many or a small number of large vessels owned by few.

This information facilitates the assessment of likely effects of different EAF management options and helps identifying needs for mitigating action. For example, EAF managers may need to consider what economic alternatives exist for the displaced labour if fishing effort reduction is deemed necessary and what can be done to provide alternative livelihood options (see also Part II, Section 2).

2.7.3 Trade and global markets

Exports of fish and fishery products have grown steadily over the last few decades with almost 40 percent of world fish production now entering international trade. Also, there have been important developments during the last decades intending to support the role of governments in ensuring responsible fisheries worldwide. Although the World Trade Organization (WTO) – established in 1995 on the basis of the General Agreement on Tariffs and Trade (GATT) – has no specific agreement dealing with the environment, the WTO agreements confirm governments' right to protect the environment, provided certain conditions are met, and a number of them also include provisions dealing with environmental concerns. The objectives of sustainable development and environmental protection are included in the preamble to the agreement establishing the WTO.

WTO members can take "measures necessary to protect human, animal or plant life or health" and "measures related to the conservation of natural resources". This includes measures that otherwise would not be permitted under WTO rules. This principle has been confirmed in several disputes involving fish and fishery products as well. However, such environmental action must be applied without arbitrary or unjustifiable discrimination and must not constitute a disguised restriction on international trade. In other words if a government wants to improve its environment, such measures must be applied equally to domestic and foreign products.

In pursuing an EAF, it is imperative that the impacts of globalization and international fish trade on the possibilities to manage the use of ecosystem resources be understood and addressed by all stakeholders engaged in formulating policies and management plans relevant to EAF. In fact, the range and speed of globalization and the resulting impact on national fisheries place an even higher degree of responsibility on national governments in ensuring sustainable fisheries management practices, including those related to international trade. Confronting this challenge may mean also having to address issues outside the usual mandate of fisheries departments and this is an area where cross-sectoral collaboration and multidisciplinary EAF teams are particularly important.

2.7.4 Distributional and equity issues

Intergenerational equity (i.e. ensuring fairness in allocation and use of resources between generations) and intra-generational equity (i.e. ensuring fairness in allocation and use of resources within the current generation) are central to the concept of sustainable fisheries management and should thus be key principles guiding efforts to move toward more responsible approaches to fisheries management through EAF.

Thus, in the development of policies and plans, and in the identification of appropriate management options, there needs to be careful consideration

of proposals and decisions in relation to short-term and long-term benefits and costs. EAF policies, management plans and measures have to be concerned with improving the state of ecosystems and resources for current and future generations that leads to overall long-term social, economic, institutional and ecological sustainability. It is likely that, in the short-term, the implementation of an EAF could lead to a reduction in fishing effort and hence hardship for some, particularly where alternative livelihoods or interim relief measures cannot be identified and introduced. Distributional effects are further discussed in Part II, Section 1.

2.7.5 Poverty and vulnerability

Implementing EAF in a poverty context requires a better understanding of the local situation because the livelihoods of stakeholders are often particularly vulnerable to changes. It also requires special attention to how stakeholders are selected and appropriate approaches for ensuring their effective participation, in particular when including marginalized groups.

Fisheries-related poverty can be viewed as both a result of inadequate fisheries management (e.g. depleted fish stocks) and a constraint to moving toward a more responsible approach to fisheries management. The constraint stems from the fact that it is commonly ethically and politically problematic to exclude poor people from fishing without creating alternative sources of food and livelihoods. In addition, when food is an absolute requirement, responsible fisheries practices become very much a secondary issue for those dependent on the fishery. Neither can the reality of poverty in fishery-dependent communities be necessarily resolved through fisheries (or ecosystem) management, since it is not always directly related to the resource or catch levels. For example, in some fishing communities fishers may catch and trade reasonable volumes of fish, but structural poverty might be prevalent because access to health and other social services is lacking, physical infrastructure is poor and representation on political structures is inadequate. Moreover, social and institutional structures may exclude poor and marginalized groups from influencing the access to and use of fishery resources.

While fishing may not necessarily generate high economic returns, for many households, fishing activities often provide a way to sustain livelihoods and prevent people from becoming poorer. From an economic perspective, there may be no resource rent generated by such activities, but from a social and cultural point of view, this way of providing livelihoods is vital. In areas where alternative employment is scarce, and where social security is not common, fisheries constitute a kind of welfare system or safety net that reduces dependency and vulnerability by reducing exposure and sensitivity to risk. If fishing is highly seasonal for natural resource reasons, then poverty may also be seasonal. Policy or management

interventions that restrict access to fisheries resources can exacerbate the vulnerability status of poor fisher households and communities. It is therefore imperative to understand the vulnerability context in which resource users operate and this context should inform the nature of policy and management measures considered (see also Part II, Section 5).

2.7.6 Gender

In many societies and human groupings, social institutions and values tend to maintain and reproduce differentials in power, economic, and social relations between men and women, which give rise to different degrees of inclusion/exclusion in most social groupings. In such circumstances, men and women assume different roles, rights, responsibilities and obligations in the fishery system and thus have different life courses and needs. Although gender roles and relations are situation specific and require an in-depth analysis to be clearly understood, there is generally a labour division along gender lines with men focusing primarily on harvesting (fishing from boats) and women on land based activities like fish culture, fish processing and marketing. Where women participate in fish capture and pre-fishing activities, it is often by preparing and mending nets or by preparing bait, or financing fishing activities undertaken by men.

In fisheries, resource management programmes and initiatives often target primarily male members of the community, and women are generally assumed to be secondary role players and are given a lower priority. These approaches not only reinforce and perpetuate traditional hierarchical divisions of labour and decision-making, they also depart from the basic principles of participation and social justice which underpins EAF.

The introduction of EAF policies, plans and management measures needs to take into account the differential effects of these interventions on men and women. Gender equity should be included in development programmes, especially in resource management. Gender planning would take into account the practical needs of men and women resulting from the actual conditions they experience because of prescribed gender roles, as well as women's strategic interests (i.e. what is required to overcome the generally subordinate position of women to men), within the existing social, economic, cultural and political contexts. Mainstreaming gender in EAF means planning that focuses not only on providing for equal treatment of men and women involved in fishing related activities, but planning that ensures equitable outcomes. Thus, in the formulation of EAF policies and plans, it is desirable to use participatory methods that provide opportunities for the differential needs of men and women to be identified and addressed.

What are the main aspects of the social, economic and institutional context that EAF should consider?

In order to accurately incorporate and capitalize on the human dimensions relevant to an EAF, the fishery system defined in coherence with the scale and boundaries of the EAF and its components from "hook to cook" as well as context need to be understood and considered, including:

- the stakeholders, their different goals and aspirations, and the power relations between different groups;
- the aquatic ecosystem services and how they are valued by stakeholder groups and society;
- the legal, policy and institutional legal frameworks; and
- the socio-economic context of the fishery system, including employment and livelihoods, the economic status of the fisheries, trade and global markets, distributional and equity issues, poverty and vulnerability, and gender.

3. INFORMATION FOR EAF

3.1 The "best available information" principle

Ecosystem approaches are often perceived as being data-intense, analytically complex, requiring large amounts of information and extremely costly. This may be true in some cases, but there are many options and paths for initiating and establishing an EAF that are no more onerous than conventional fisheries management. For example the "best available [scientific] information"[22] could in some cases be confined to traditional knowledge and basic fishery assessments. Inadequacy of scientific data should not, in principle, hinder the application of EAF provided the precautionary approach is applied appropriately. As pointed out previously, EAF starting points and paths may differ markedly and an incremental approach to adopting EAF is often decided as the most effective. In such an incremental approach, the minimum data set may simply be that which allows fisheries managers and other stakeholders to obtain a reasonably comprehensive appreciation of the fishery system. The best available information is likely to come from a mixture of qualitative and quantitative data generated by utilizing various knowledge types and sources.

[22] The Code stipulates that the best scientific evidence available shall form the basis for conservation and management measures (see, for example, Article 7.1.1). It also outlines requirements in relation to fisheries research (Article 12).

In the *EAF Guidelines*, an overview is given to the information requirements and use in the different components of the EAF process.[23] This chapter provides general guidance on the generation and use of human dimensions information, the characteristics of information systems for supporting successful EAF, and other EAF information particularities.

3.2 Information systems

The purpose of information systems, including both research and routine data collection (e.g. fishery statistics, gender profiles, poverty indices), is to provide data that are useful for decision-making. Research and data collection for EAF should be limited to what is essential for the EAF decision-making process. This applies to biological and ecological information but is especially important for social science research and data collection since they are often particularly time-consuming, costly and intrusive. The data needs should hence be clearly defined and the data collection methodologies should be appropriate to the social context, have the support of fishery stakeholders and be unobtrusive to the extent possible.

3.3 Integrating different knowledge systems

Information can be obtained from different knowledge systems that may be compatible to various degrees. EAF should draw on different knowledge systems including:

- traditional knowledge (or indigenous knowledge), typically a deep cultural feature evolved and passed down through generations within particular groups, often of aboriginal peoples;
- local knowledge, typically a more recent knowledge set and shared by people in a particular location; and
- scientific knowledge, typically generated through carefully designed research experiments, reasoning or observation within academic or technical social or natural science settings.

Often information will be available from all three knowledge systems and include both qualitative and quantitative information, which may cause problems of integration. However, tools for and examples of such integrations exist. As an example of integration, one can use participatory geographic information systems (PGIS)[24] to maximize the contributions of different knowledge types to the generation of integrated biophysical, socio-

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[23] See Chapter 2 of the *EAF Guidelines*.

[24] For an example application of PGIS, see Wedell, V.A. 2007. *Capturing local knowledge for cooperative fisheries management using participatory geographic information system (GIS) approach in Port Orford, Oregon.* http://hdl.handle.net/1957/4786.

economic and governance information, and then use this product for management decision-making in data-poor situations.

Risk and uncertainty are relevant to information for EAF in general but the treatment of these from a human perspective is particularly important since they have implications for the behaviour of the people in the fishery system. It is often useful to engage all three types of knowledge systems in order to understand how various stakeholders perceive and react to risk and uncertainty. EAF needs to take matters such as vulnerability patterns, risk exposure and resilience levels into account, including the social strategies that people develop for coping with risk and uncertainty.

It is important that EAF managers learn about different data and knowledge types, how to integrate them and how to overcome real or perceived barriers between holders of different sets of knowledge. Much of this can be accomplished through the use of participatory approaches, interdisciplinarity, capacity building for handling of different knowledge types, stakeholder communications and appreciation of how different stakeholders perceive and cope with risk and uncertainty based on their own knowledge.

3.4 Sources and types of data and information

Human dimensions data requirements for EAF have more diverse sources than those for conventional fisheries management practices, extending beyond fisheries to other economic sectors and uses of the aquatic environment. For example, in an EAF for a coastal watershed and marine system, data sources could include an agricultural census, a coastal industry labour force survey, tourism studies and an analysis of traditional uses of forest products. EAF may also rely more upon household rather than solely fishing enterprise data as is often the case in conventional bio-economic analyses. The use of household-based data often facilitates comparisons among economic sectors and connections with other ecosystem research.

Data needs for both short and long-term EAF components have to be prioritized. For example, data on site specific poverty and living standards may be required immediately through targeted short-term research, but basic demographic data may await the next national population and housing census. Revising information needs and sources will be part of the adaptive management process (see also Part II, Section 3). When possible, critical data needs that are identified and initially met by targeted short-term research, should be incorporated into future census exercises or routine data collection programmes.

3.5 Participation in information systems

As in other aspects of EAF planning and implementation, stakeholder participation is also important when it comes to data collection, analysis, interpretation, validation, monitoring and evaluation as well as to sharing in

decision-making at various levels. In the context of human dimensional research and information generation, participation should be used where beneficial and feasible, as an appropriate means toward well-defined ends. This is particularly the case as there are many different costs to participation, borne in different proportions by different stakeholders.

In pursuing participation in research and information generation, management authorities should beware, however, of coercing or co-opting less powerful stakeholders to join in the process and of simply transferring costs to ease their own burden. The approaches to establishing and sustaining participation in research and information generation are no different for the social, economic and institutional aspects of EAF than for ecological aspects of EAF or for conventional fisheries management practices but, because emphasis is on human dimensions, special care must be taken. For example, focus groups and workshops are common methods for participatory research in many contexts, but in social, economic and institutional research the generation of good quality data and information is often quite dependent on taking into account stakeholder interactions more than is the case for biophysical data.

3.6 Interdisciplinarity

Fisheries authorities still tend to be dominated by natural scientists and natural science perspectives with inadequate social science capacities. However, and much more so than in conventional fisheries management practices, the human aspects of EAF research and information generation require interdisciplinary, not just multidisciplinary, capabilities. Although there is an increasing trend in universities to offer interdisciplinary courses and programmes in fisheries that include social sciences, many practical management skills are often lacking (e.g. facilitation, negotiation and change management). In EAF, current research into governance and institutional networks also draws heavily upon other areas such as business and organizational management that are not typical academic disciplines. Managers may need to acquire knowledge and skills outside of their management authorities through appropriate networking and formal or informal alliances to handle the human aspects of EAF.

3.7 Raising awareness and communication strategies

A critical part of information management, especially when dealing with change and human dimensions, is effective communication. Much information will be needed to manage the change from no or conventional fisheries management practices to EAF. One of the first steps is raising awareness, which may be combined with various levels of advocacy to make the message more influential.

The ways of raising awareness are numerous and some are more culture-bound than others. Public talks, media presentations and printed material in

newspapers, brochures, flyers, posters and the like are relatively common communication mechanisms. Use of scenario modelling and other innovative means of conveying complex information to stakeholders of diverse backgrounds may be used to increase the efficiency of communication in multistakeholder processes. The choice of communication or dissemination mechanisms will depend on the target audience and their social-cultural context.

The systematic development of a communication strategy with well-defined components is especially important in EAF due to the common relatively large number and diversity of stakeholder groups involved and the likelihood of their not being within the normal communications circle of the fisheries authority. At the same time, the broad stakeholder basis provides an ideal vehicle for encouraging information exchange. Sharing information and perspectives is an integral part of the social, economic and institutional aspects of EAF.

Does EAF require costly information and data collection systems?

EAF is about improving decision-making and implementation of fisheries management in an ecosystem context and it does not require detailed information on how the ecological, social, economic or institutional systems work, although reducing uncertainties by increasing knowledge will generally improve implementation. Analogous to the precautionary approach, lack of data should not be a reason for delaying the start of an EAF but low-cost information approaches (i.e. relying on best available information) may have to be applied as opposed to high-cost information approaches (i.e. research intense).

PART II – FACILITATING EAF PLANNING AND IMPLEMENTATION

1. EAF ASSESSMENT AND PRIORITIZATION PROCESSES

1.1 Identification of issues and decision-making

With broad based stakeholder participation and a fishery system perspective, it is likely that a wide variety of issues will be identified for inclusion in the EAF. As mentioned in Part I, Section 1, there is a need to prioritize which issues that should be addressed by EAF and its management plan and which are of lesser importance. This is a process requiring effective participation and negotiations during several stages of the EAF process as the level of detail increases from broad issues to more specific matters. In the *EAF Guidelines*, the hierarchical tree or framework approach, coupled with a risk assessment, developed in Australia in the context of ESD, was adopted as a tool in this process.[25] In this chapter, cost and benefit assessments, risk analyses and distributional impact reviews are discussed. All these different approaches are complementary and the different methods can be used to calculate inputs for or in combination with analytical frameworks available for assisting in decision-making and other broader cost-benefit analyses (CBA), indicator frameworks (see also Part II, Section 3 below), national accounting systems, asset mapping, and bio-economic and ecosystem models (see Box 7).[26]

1.2 Assessment of costs and benefits

The Code calls for studies and evaluations of the benefits, costs and effects of different management options (Articles 4.4.3 and 7.6.7). The widespread support for EAF reflects its potential to support production of a range of benefits both ecologically and in relation to human considerations, such as an increase in sustainable employment and income generation as a result of rehabilitated ecosystems, a reduction in the risk of fishery collapses, and various aesthetic benefits. At the same time, there are costs involved in implementing EAF, ranging from direct costs of implementation (e.g. increased management costs) to possible indirect or induced costs, resulting from how the EAF is implemented.

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[25] See Chapter 4 of the *EAF Guideline*.

[26] Appendix 3 in the *EAF Guidelines* gives more information on economic valuation and the System of Environmental and Economic Accounts (SEEA) is discussed in its Chapter 3.4. The valuation methods and decision-making tools are discussed in more detail in the *FAO Fisheries Technical Paper* No. 489 (Chapter 6).

Box 7
Ecosystem modelling

There is an increasing availability of ecosystem models of different types that can be used in a variety of ways in the decision-making process, ranging from enhancing the conceptual understanding to providing information for strategic or tactical decisions. However, while it is necessary to include social and economic outputs in an ecosystem model in order to be able to effectively relate the impact of proposed actions or measures to management objectives, the human dimensions are generally poorly or incompletely considered in currently existing modelling frameworks. The implementation of economic models within ecosystem models is often based on overly simplified assumptions or lack of data. Close interdisciplinary collaboration is required in order to create qualitative, mathematical models based on biological, economic and other social science theory that can be useful for policy and management option analyses. The FAO Technical Guidelines on *Best practices in ecosystem modelling for informing an ecosystem approach to fisheries* (No. 4, Suppl. 2, Add. 1, 2008) gives an overview of the current situation.

As discussed in Part I, Section 1, ecosystems generate services that represent benefits (see also Box 8). These benefits may change when systems change from the conventional fisheries management practices – or no management – to EAF, and different management decisions will have different impacts on the ecosystem services. EAF managers need to understand what the consequences of different management options are, including for whom and when costs and benefits incur. To help decide between different options, EAF managers need to assess and compare their options to determine the most efficient means to address issues within the EAF management system. These assessments should go beyond direct and immediate impacts and include wider societal goals as reflected in the EAF objectives.

Box 8

Ecosystem services and their values

The services that ecosystems provide to humans represent benefits. These may be in the form of use values (the benefits of actually using the resources), such as net economic benefits of fishing (including income through employment), the provision of food and food security, non-fishing use values that arise from the ecosystem (e.g. from tourism), and the value of fishery ecosystems as mechanisms for social interaction and providers of livelihoods. There may also be non-use and existence values (those not based on extracting the resources), such as cultural benefits of fisheries ecosystems (e.g. for artistic expression or ceremonies), aesthetic and existence benefits (e.g. the value of watching a sunset by the sea, or of knowing that whales are swimming in the sea), and the "option value" that measures the possible future benefits that might be realized as a result of maintaining healthy ecosystems.

A range of methodologies exist for quantifying costs and benefits. Most of these approaches and tools have been developed from economic concepts and principles and seek to assign values that enable comparisons across a number of attributes to be made. The economic theory of valuation is based on peoples and society's wants, desires and preferences. These preferences are expressed through the choices and trade-offs they make based on consideration of resource and time constraints. Economic valuation is often useful in EAF because of its ability to cut across resources, sectors and stakeholders in measuring the different values of ecosystem services. It provides a common denominator that participants can appreciate and use for comparison. Economic valuation methods include quantitative economic valuation methods such as revealed-preference approaches, stated-preferences approaches and cost-based approaches, as well as non-monetized assessments, e.g. individual index-based methods and group-based methods.

In spite of the available methods and frameworks, some costs and benefits may remain difficult to assess in an objective manner. Still, identifying and listing likely costs and benefits constitute an important "thought process" and lack of precise data should not prevent EAF managers from assessing costs and benefits as part of decision making.

The wide range of potential costs and benefits related to EAF can be grouped in different categories, i.e. ecological, economic, social and institutional costs and benefits. Table 2 gives some examples of different potential costs and benefits in these different categories. Operating expenses and funding of EAF are further discussed in Part II, Section 4 on sustaining an EAF.

Table 2. Examples of possible EAF costs and benefits

	Benefits	Costs
Ecological costs and benefits	• Healthier ecosystems (directly or with EAF linkages to effective integrated management) • Sustained production of services from aquatic ecosystems (a global benefit) • Improved fish stock abundance (due to healthier ecosystems) • Reduced bycatch of turtles, marine mammals, etc.	• Greater highgrading or discarding, and thus more wastage (if catch and/or bycatch is restricted through catch quotas) • Reduced fish catches to sustain abundance of predators, e.g. seabirds or seals, due to better protection
Economic costs and benefits	• Increase in benefits to fishers per fish caught (i.e. bigger fish from a healthier ecosystem) • Greater livelihood opportunities for fishers (e.g. in tourism, if charismatic species abundances increase through EAF) • Increased non-use (e.g. cultural) and existence values (e.g. from an appreciation of healthier aquatic systems and an increased abundance of aquatic life, etc.)	• Reduced catches (especially in short term, to re-build stocks and ecosystems) • Increased operational costs • Reduced contribution to the economy (in the short term, due to reduced fishing activity) • Reduced employment, in the short term and possibly the long term
Social costs and benefits	• Positive impacts on food supply in long term (if greater catches become possible) • Greater resilience (if EAF implementation increases livelihood diversification) • Reduced conflict (if EAF processes deal effectively with interfishery and multisectoral issues)	• Negative impacts on food supply in short term (and risk of this also in long term) • Greater inequity (if EAF favours those able to invest in appropriate technology) • Greater conflict (if EAF leads to enforced interaction among a larger set of societal and/or economic players)

Table 2 (cont.)

Institutional (management) costs and benefits	• Better integration in management across fisheries, and with other aquatic uses • More robust management due to broadening from conventional single-species tools to more integrated management approaches • Improved compliance due to more "buy-in" to management, through better participation	• Increased cost of management • Increased cost of coordination across fisheries and other aquatic uses • Increased risk of non-compliance (if regulations too complex or unacceptable)

Source: Adapted from Charles, A. and De Young, C. 2008. Benefits and costs of implementing the ecosystem approach to fisheries. *In*: Bianchi, G. and Skjoldal, H.R. (eds). 2008. *The Ecosystem Approach to Fisheries*. FAO and CABI, 363p.

1.3 Risk assessment and management

Assessing costs and benefits is closely related to the concept of risk assessment. It is important not only to assess potential cost levels, but also the associated risks of negative impacts – the product of the probability of occurrence and the magnitude of the cost. Managing such risks becomes an important part of EAF planning and implementation.

There are a number of threats and challenges that are likely to be faced when implementing an EAF and risk is likely to represent different things to different stakeholders. For the EAF manager, risk is the chance of something happening that will affect the possibilities to achieve and perform in accordance with the objectives that have been defined for the management system. On the other hand, for the private fisheries industry, risk generally relates to potential negative effects on profitability. For a community or the society, risk could represent the possibility of not benefiting from ecosystem services.

Threats and challenges are found both at the macro-level, with regard to issues such as equity and poverty, and at the operational level in the complex context of "people processes" in EAF management (e.g. how to reconcile competing objectives of different stakeholder groups or how to ensure efficient and cost-effective participation of all stakeholders). Due to the complexity and likely level of uncertainty, different forms of challenges could be more common in EAF than in conventional fisheries management practices and hence risk assessment can constitute an important part of management.

Techniques such as check lists and problem trees are useful to identify risks associated with EAF issues in specific fishery systems. The various

approaches and methodologies developed to assist in value estimations of ecosystem costs and benefits can be used also to assess and quantify risk and potentials impacts. At times, it may be possible to quantify the risk in terms of costs but, at other times, this is not possible and different risks may instead be rated and ranked according to a predefined scale. The basic goal of the approach is the creation of a standardized basis for comparing the costs and benefits of two or more states of an ecosystem, or of different management options, and in this way provide information that can be incorporated into a broader decision-making framework.

In combination with other tools, risk assessment can be used at the planning stage for deciding which components and issues to include – and not include – under EAF management. Together with the hierarchical tree approach mentioned above,[27] a method based on risk analysis has been developed in Australia for the implementation ESD in fisheries (see Box 9). The approach has been used as a basis for analyses in planning by EAF implementers. For example, the Benguela Current Large Marine Ecosystem (BCLME) region[28] applied a combination of participatory workshops and Risk Assessment for Sustainable Fisheries (RASF) when identifying and prioritizing issues and potential management responses for those issues.

1.4 Distributional impacts

Also crucial in EAF management, as elsewhere, is an understanding of the distributional impacts involved, i.e. who benefits and who does not, as well as how the costs and benefits occur over time and over space. Such distributional impacts need to be understood and appropriately taken into account in order for EAF management to succeed.

1.4.1 To whom do the various costs and benefits accrue?

A major consideration in EAF implementation is the question of who receives the benefits and who incurs the costs of that implementation, in particular if these are not the same people or stakeholder groups. For example, with regard to MPAs, costs of enforcement for a community may be high and, without tenure, the benefits may be spread widely. Within a given fishery ecosystem, the migration of fish and/or larvae may lead to situations in which those incurring the costs of conserving resources or habitats may not be those receiving the benefits (or at least may be sharing the benefits with others who are not incurring costs).

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[27] See also footnote 25.

[28] The Ecosystem Approaches for Fisheries (EAF) Management in the Benguela Current Large Marine Ecosystem (BCLME) is a GEF/FAO regional collaboration project including Angola, Namibia and South Africa. See *FAO Fisheries Circular* No. 1026, FAO, Rome, 2007 and www.bclme.org.

Box 9

Risk assessment as part of the EAF process

In the implementation of ESD in fisheries in Australia, a risk assessment technique is used to help determine what issues need to be directly managed and those that may not need to be included and as a basis for management decisions.

The assessments can take place at various levels of scale and detail. Usually a higher level approach is taken initially. When the overall level of risk is found to be high, a finer level assessment takes place as part of the process to develop appropriate management actions.

Based on an inventory of issues and potential hazards – categorized into different ecosystem aspects, e.g. target species, habitat issues, political/social effects – the approach includes the development of "consequence tables" under different management scenarios (current management compared to other proposed arrangements). The possible consequences range from negligible to catastrophic. These ratings are combined with an assessment of the likelihood of the particular consequence to arise and the end result is a risk matrix, e.g.:

		Consequences					
Risk matrix		Negligible	Minor	Moderate	Severe	Major	Catastrophic
Likelihood		0	1	2	3	4	5
Remote	1	0	1	2	3	4	5
Rare	2	0	2	4	6	8	10
Unlikely	3	0	3	6	9	12	15
Possible	4	0	4	8	12	16	20
Occasional	5	0	5	10	15	20	25
Likely	6	0	6	12	18	24	30

By deciding what level of management is needed for different risk values, guidance is given to what actions to take. For example, "extreme" risk values (> 19), are likely to need additional management activities while nil or a "low" rating (1-6) may not require specific management measures in the short term.

Source: Based on Fletcher, W.J., Chesson, J., Fisher, M., Sainsbury, K.J., Hundloe, T. Smith, A.D.M. and Whitworth, B. 2002. National ESD reporting frameworks for Australian fisheries: The How To guide for wild capture fisheries. FRDC Project 2000 145, Canberra, Australia. 120p.

1.4.2 When do the various costs and benefits occur?

The various costs and benefits of EAF implementation may occur over a wide range of time scales. It is possible that some of the potential benefits occur over a longer time frame, while some costs arise almost immediately. There may also be certain realities connected with the time dimension (e.g. annual food supply considerations, electoral time frames, or differences in discount rates) that affect or constrain the implementation of EAF. Inter-generational equity also comes into play; costs and benefits may occur over time periods stretching across generations and, hence, do not accrue to the same people (see Box 10).

1.4.3 At what scale do costs and benefits occur?

Similarly, the costs and benefits may occur over a wide range of spatial (geographical) or administrative scales, such as local, national or international. There may, for example, be a benefit to EAF management that is international in scale (such as increased value of conserved biodiversity) and a corresponding cost that is local (e.g. a negative impact on the income of fishers in a specific fishing community near a protected area). Depending on the situation and context, various other combinations could arise.

2. MECHANISMS FOR EAF IMPLEMENTATION

2.1 Enabling legal frameworks

The Code (Articles 7.7 and 10.1) states that effective legal and administrative systems shall be in place for fisheries management and for achieving sustainable and integrated use of the resources. The change in fisheries management policy that the introduction of EAF entails is likely to require changes in legal frameworks. While EAF is supported by a variety of international (voluntary) instruments (see Part I), at the national level, EAF is frequently poorly reflected or implemented in national fisheries policy and legislation. This leads to weak capability for cross-sectoral consultation and cooperation, and the failure to consider, or a legal inability to act on, external influences such as pollution and habitat deterioration that impact on current fishery management regimes.

Box 10

Inter-generational equity

Among the main principles relevant to EAF listed in the *EAF Guidelines* (Annex 2), the need for establishing and preserving "intergenerational equity" is mentioned in the context of improving human well-being and equity. The guidelines state that long-term consequences should be appropriately considered in decision-making, that actions that are potentially irreversible in the future - within an agreed time frame – should be avoided, and that rehabilitation of degraded environments may be required.

The concept of intergenerational equity is firmly anchored in international law. The United Nations Charter, the Preamble to the Universal Declaration of Human Rights and other human rights conventions and documents convey "a fundamental belief in the dignity of all members of human society and in an equality of rights that extends in time as well as in space" (Brown Weiss, 1992).

In the context of EAF, addressing intergenerational equity means that there is a need to take the rights of future generations into account and to make decisions with regard to how these are best met. Future generations are not represented among the stakeholder groups and, hence, cannot make claims or identify priorities themselves. A discussion among existing stakeholders is needed to agree on how the future should be valued. In practice, it may be helpful to appoint an external party to formally "represent" future generations in the EAF consultative processes, allowing for a potentially more objective analysis of future values. Intergenerational valuation methods can also be applied, i.e. intergenerational cost and benefit analyses taking future costs and benefits into account by applying discounting periods allowing for the inclusion of future generations.

Source: Brown Weiss, E. 1992. *Environmental change and international law: New challenges and dimensions*. United Nations University Press. Tokyo, Japan. Available at www.unu.edu/unupress/unupbooks/uu25ee/uu25ee00.htm#Contents.

A supporting legal framework can provide the basis for many of the changes required to initiate, implement and sustain an EAF, e.g.:

- providing mechanisms for stakeholder involvement in decision-making;
- providing legal mechanisms for conflict management;
- defining roles and responsibilities clearly and transparently, including the management and regulatory powers of the responsible authorities;

- decentralizing decision-making and management responsibilities and establishing mechanisms for co-management;
- establishing or confirming use and management rights;
- providing for spatial and temporal control of fishing; and
- providing mechanisms for coordination and integration between the fisheries administration and other institutions in charge of ecosystem maintenance and use.

A legal framework should furthermore provide for the establishment of EAF management plans and clearly designate the institutions responsible for implementing and enforcing such plans. To that effect, the legislation should clarify:

- the decision-making entities at various jurisdictional levels;
- the geographical area the EAF policy covers;
- the stakeholders bound by the policy;
- the institutions responsible for implementing and enforcing the management plan; and
- how institutional and jurisdictional disputes will be resolved.

Existing legal instruments hence need to be assessed and adjusted where needed and where possible. Implementing and sustaining EAF effectively not only requires suitable fisheries legislation, but would also benefit from suitable legal frameworks in other sectors (see also Part II, Section 4). Providing for the above mentioned measures and mechanisms in national legislation will reduce overlaps and conflicts both between sectoral management institutions and between different tiers of government by delineating roles and responsibilities. It should be noted, though, that since EAF most commonly evolves based on current fisheries management practices, some regulations and legal provisions may already be in place and do not need to be replaced, only adapted as required.

2.2 Appropriate institutional arrangements

2.2.1 Policy and institutional change

Together with the need for appropriate legal frameworks, the Code also mentions requirements with regard to policy and institutional structures (e.g. Articles 7.1.1 and 10.1.1). As discussed in Chapter 4.2 of the *EAF Guidelines* and mentioned above in Part I, Section 1, an EAF is likely to require fundamental changes in the institutional arrangements governing fisheries management. These changes need to address, *inter alia*:

- incorporation of uncertainties into the EAF decision-making processes due the increase of factors causing such uncertainties;
- mechanisms for effectively involving the broadened definition of stakeholders in decision-making and management, including

definition of roles and responsibilities, and mechanisms for conflict management;

- provisions for devolution of authority, e.g. decentralized decision-making and management responsibilities, to allow for allocation of rights and set-up of co-management systems, as required; and
- increased coordination, cooperation and communication within and among relevant institutions and resource user groups, in the fishery sector and outside.

It is also necessary to ensure an effective overall structure and functioning of management, which requires appropriate institutional arrangements. In this context, "institutions" refer not only to governmental and non-governmental agencies that are needed to implement EAF management, but also to the sets of rules and structures within the fishery that facilitate the knowledge generation, information exchange and discussions among the wider set of EAF stakeholders.

Implementation of such institutional arrangements will typically take place at the policy level, but these have strong implications for all levels of management. Guiding this prospective adaptation should be the idea of "good governance". Governance describes how political, economic, administrative and other forms of power or authority are exercised to manage a country's resources and affairs (see Box 11). Good governance is hence a fundamental principal for the whole EAF process.

2.2.2 The precautionary approach

The precautionary approach is a key underlying basis for incorporating uncertainty into decision making. It is articulated in Article 7.5 of the Code and the related FAO Technical Guidelines stipulate that "where there are threats of serious irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".[29] Under EAF, the application of the approach is much broader than environmental degradation and applies to any undesirable outcome, including social or economic. This notion is particularly important when the people and communities potentially affected are highly vulnerable.

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[29] See the EAF Guidelines and *FAO Technical Guidelines for Responsible Fisheries*: Precautionary approach to capture fisheries and species introduction (No. 2). 1996. 54p.

Box 11
The concept of "good governance"

An important element of any form of management – whether relating to EAF or not, and indeed whether focusing on fisheries or other sectors – is the idea of "good governance". It often accompanies the ideals of sustainable development to promote civil society and intergenerational equity. Widely accepted principles guide the "best practices" of governance:

- Participation by men and women, the old and young, the vulnerable and disadvantaged, through legitimate institutions of organized civil society.
- Fair legal frameworks, enforced impartially, and respectful of human rights.
- Transparency in decision-making and implementation, with information available and accessible to stakeholders in easily understandable form.
- Responsiveness to serve all stakeholders, institutions and processes within a reasonable timeframe.
- Consensus-oriented, while understanding and respecting different interests in society from historical, cultural and social contexts, so as to pursue decisions that are in the best interest of the whole society.
- Equity among members of society who have a genuine stake, ensuring that the most vulnerable have opportunities to improve or maintain their well-being (e.g. pro-poor).
- Effectiveness and efficiency for processes and institutions to produce results that meet the needs of society while making the best sustainable use of resources.
- Accountability requires government institutions, private sector and civil society to be accountable to stakeholders and the public both under law and informally.

Source: United Nations ESCAP. 2009. What is good governance? United Nations Economic and Social Commission for Asia and the Pacific webpage (www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp).

2.2.3 Effective stakeholder participation

Participation was mentioned in the context of stakeholder identification and involvement in Part I, Section 2 but being a central theme in the EAF process as well as a key principle underpinning the Code (see Article 6.13),

it merits further discussion. Calls for participation are based on the belief that people have the right to participate in decision-making processes that affect their lives, and that policy, planning and project-level processes that have been informed by interested people lead to better outcomes as they are more responsive to societal needs. These convictions about the value and benefits of participation are equally relevant to EAF management, whether that participation occurs in formulating policies, preparing management plans, undertaking research, implementing management measures or conducting monitoring and evaluation.

There are numerous tools and methods to support participation that can be employed in the context of EAF. These include:[30]

- methods of convening people together, such as workshops, focus groups and citizens' juries (the latter being particularly effective in involving citizens in formulation of policy);
- information gathering methods, such as social mapping and transect walks;
- dissemination tools appropriate to the targeted public; and
- comprehensive analytical methods, such as participatory and rapid rural appraisal.

However, a shift toward a more participatory approach to fisheries policy and management requires a fundamental shift in thinking and attitude by both government agencies and stakeholder groups. It requires both groups to recognize the mutual benefits of engaging in such participatory processes and to put in place mechanisms that will foster dialogue and build trust. A participatory process also requires that special attention be given to mechanisms for involving the poor, marginalized and/or unorganized sectors of society, as well as the ability to recognize and incorporate new stakeholders as they become known. Capacity building and skills development are often fundamental requirements for effective participation.

2.2.4 Management and use rights

Determining how rights are allocated and managed in the fishery is another key institutional matter. There are two key forms of rights to be considered: management rights and use rights. They can be seen as parallel forms of rights, both playing a key role in fisheries management; the former specify the right to participate in fishery management just as the latter specify the right to participate in the fishery itself. Within each of these categories of rights, choices can be made in terms of the organizational level at which to implement the rights, i.e. rights held by individuals, by communities or

[30] Some of these methods are further explained in the *FAO Technical Paper on the human dimensions of EAF.*

regions, or by specific groupings such as fishing vessel or gear sectors. The *EAF Guidelines* gives an overview of different types of right-based management approaches.[31]

The Code (Articles 6.18 and 10.1.3) makes reference to use rights, not only within fisheries and but pertaining to coastal resources in general. A key aspect in moving toward responsible fisheries thus lies in developing effective and accepted sets of both rights and responsibilities among fishers. This realization has led to the emergence of new institutional arrangements in the form of co-management in which a set of agreed fishery stakeholders together with government agencies jointly participate in fishery management and decision making, and specifically the development, implementation and enforcement of fishery regulations and management measures (see Box 12).

Use and management rights under EAF will need to deal with other "users" of the ecosystem beside the specific stakeholders in the fishery being addressed. Other fisheries, aquaculture, offshore oil and mining activities, eco-tourism and/or coastal tourism, shipping, urban development, coastal industries, and other aquatic-based human endeavours all vie for resources and impact on the ecosystem along with fisheries. This broadening of stakeholders in EAF may take co-management systems further in what is referred to as "multi-party co-management", involving linkages to multiuse integrated aquatic management. This multiparty approach can bring a wide range of rights-holders into EAF management and typically requires attention to procedural issues and institutional development to deal with multiple-use situations.

2.2.5 Coordination and intersectoral interactions

Integrating fisheries and other uses of the ecosystem (e.g. in the marine coastal, riparian or lacustrine areas[32]) in the EAF process requires formal organizational arrangements between fisheries management institutions and other sectoral institutions. However, particularly when the fisheries agency of a given jurisdiction is functionally and historically separated from the agencies or departments managing other aquatic uses (whether shipping, tourism, aquaculture, urban and industrial development, etc), there may be a need also for the creative development of informal linkages among managers. These formal and informal arrangements can take many forms, including cross-sectoral working groups or coordinating bodies. As mentioned above in Part I, Section 1, a multidisciplinary EAF team,

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[31] See Chapter 3.2.4 of the *EAF Guidelines*.

[32] The Code (Article 10) states the importance of integrating fisheries into coastal area management and the institutional and policy requirements this implies.

including members with interdisciplinary and communication capabilities, would be an essential organizational arrangement for planning and implementing an EAF. The exact nature of the links that form between fisheries management agencies and broader integrated management agencies will vary depending on the situation at hand.

Box 12
Co-management

There has been a growing trend toward increased decentralization of governance in general as well as in fisheries management. Management responsibilities are increasingly shared among the government, communities and other stakeholders. This type of co-management system is gaining in popularity, in particular in the small-scale fisheries sector. Co-management is disposed to create a more equitable distribution of benefits and be more effective in limiting access than centralized systems. While co-management systems exist in a number of different forms, with varying degrees of shared responsibility, lessons learnt from co-management experience point at four main elements necessary for making it successful:

- An enabling policy and legal framework;
- The participation and empowerment of resource users;
- Effective linkages and institutions; and
- Resources - an asset worth managing.

It is worth noting that a co-management system can evolve without a corresponding *de jure*, i.e. a legally enshrined fishing right. However, it is likely to be more effective if the community or co-management group will have ultimately legally protected exclusive rights. There is growing agreement among policy makers, fishery managers and researchers that ensuring that fishers have well-defined and secure rights is at the core of good fisheries governance and may be an essential condition for successful EAF processes.

Source: Njock, J.-C., Angaman, K. and Allison, E.H. 2009. Chapter 5: Institutional innovations in fisheries co-management in West and Central Africa. *In*: Westlund, L., Holvoet, K. and Kébé, M. (eds). Achieving poverty reduction through responsible fisheries: strategies and lessons from the West and Central Africa Sustainable Fisheries Livelihoods Programme. FAO *Fisheries Technical Paper* No. 513. Rome, FAO.

2.3 Capacity development

Developing organizational capacity may be a perquisite for the introduction of EAF and it is likely to be a requirement throughout. Capacity building or enhancement is multifaceted and involves much more than training. Often

following an organizational assessment and restructuring, its aim is to make organizations more efficient and effective within a well-defined vision of what they hope to be and do. It is often a long-term process with different types of interventions tailored to bridge the gap between what the organization can do at the moment and what it intends to do in the future. A framework for capacity development, containing seven main elements that organizations should focus on, illustrates the breadth of capacity building beyond training:[33]

- world view: vision and mission guiding capacity requirements;
- culture: an organization's distinctive climate and way of operating;
- structure: roles, functions, positions, supervision, reporting, etc.;
- adaptive strategies: ways of responding to changing environments;
- skills: knowledge, abilities and competencies for effective action;
- material resources: technology, finance and equipment required; and
- linkages: relationships and networks for action and resource flows.

In EAF, stakeholders need to understand human system relationships in relation to the resource system. In many cases capacity may be built fairly easily and quickly if stakeholders engage in collaborative activities in which complementary skills transfer occurs. Learning by doing within partnerships is an approach well suited to strengthening EAF institutions and one that is usually cost-effective.

2.4 Incentives

As noted above in Part II, Section 1, the various costs and benefits associated with implementing the EAF arise at varying times – some in the short-term, some only after considerable time has passed – and at various scales (e.g. local, regional, national, international), impacting in differing ways the many individuals and entities within the fishery system. In other words, there are significant distributional implications. There may well be societal reasons for implementing an EAF, but perceptions among some fishery participants of the value of EAF may be negative. Such participants cannot be expected to adopt EAF practices without there being some "incentive" to do so, i.e. some considerations, whether institutional, legal, economic or social, that these individuals will factor into their decision making to induce support for EAF implementation.

Incentives are generally grouped into two main categories positive and negative. Positive incentives reward participants for acting in desired ways, so that they can increase their own well-being (e.g. profits or other benefits)

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[33] Krishnarayan, V., Geoghegan, T. and Renard, Y. 2002. Assessing capacity for participatory natural resource management. The Caribbean Natural Resources Institute (CANARI). Laventille, Trinidad. Guidelines Series 3.

while at the same time supporting EAF goals. Negative incentives penalize the participants for not following EAF rules. For example, positive incentives could be created through such measures as a subsidy on the use of conservation-enhancing fishing gear, or a sense of community that causes fishers to value the local benefits of their EAF actions. Examples of negative incentives could include the threat of fines if caught engaged in illegal fishing or social constraints on behaviour as a result of peer pressure and cultural institutions.

The major focus of conventional fishery management in the past has been on establishing sets of regulations, with negative incentives (penalties) for failing to comply with the regulations (i.e. for illegal activities). However, the use of negative incentives through regulation has not always proven successful since it requires apprehending the rule-breakers, something that may be difficult to do with limited enforcement capability and a large number of participants dispersed over large areas. This has led to a trend towards increased use of positive incentives that are designed to induce desired behaviour, potentially decreasing the reliance on finding and punishing rule-breakers. The key lies in recognizing that neither negative nor positive incentives are sufficient alone. It is useful to further develop positive incentives, but at the same time, the fact that there will always be a certain proportion of rule-breakers implies that it is important to the integrity of the management system, and the continuing support of law-abiding participants, for those rule-breakers to be apprehended and punished.

In addition to grouping incentives as positive or negative, they can also be grouped into four categories based on the nature of the incentive itself: institutional, legal, economic and social incentives (see Box 13).[34] The first two of these incentive categories – institutional and legal - are closely linked to the discussions on institutional arrangements and legal frameworks above.

It must be reiterated that no single incentive will be appropriate in all circumstances. Among the many approaches to creating incentives supportive of policy goals, such as EAF, choosing which ones to be implemented must be determined on a case-by-case basis, depending on the specific situation being faced, and the goals at hand. For example, a key goal in EAF is typically to encourage a longer-term view, placing greater

[34] The *EAF Guidelines* lists the categories of incentives in slightly different groupings: (i) institutional [and legal]; (ii) collective values [social]; (iii) non-market [economic]; and (iv) market [economic]. See Chapter 3.3 and Appendix 5 of the *EAF Guidelines*, and *FAO Fisheries Technical Paper* No. 489 on the human dimensions of EAF.

value on ecosystem health and sustainability of fish stocks. This may require certain forms of incentives that increase the possibility of participants choosing to engage in behaviour compatible with long-term conservation. Another goal might be to modify specific behaviour – e.g., to reduce dumping, discarding and high-grading of fish, or to restrict fishing gear that is particularly damaging to aquatic ecosystems. Incentives to achieve such ends may need to be carefully targeted at specific situations and specific participants.

There are also so called *perverse incentives*, which are, from an EAF point of view, any policy or management measures that incite people or groups to act in a way that negatively impacts on an ecosystem's ability to provide services or, in other words, that lead to inefficient use of ecosystem resources. Examples of perverse incentives include:

- subsidies leading to overinvestment in fishing capacity in a fishery in which management is unable to control fishing effort;
- buy-back programmes in which receipts from the sale of older boats are reinvested in modernized boats, thereby increasing fishing capacity;
- contradictory regulations leading people to ignore the laws all together;
- laws loaded with unintended negative effects, such as prohibiting the selling of bycatch leading to increased discards; and
- governmental inducements for use of fishing methods with relatively great negative impacts on the ecosystem (e.g., modernization subsidies leading to greater use of bottom-contact gears).

Logical reasoning would suggest the abolishment of existing perverse incentives as a critical step to EAF management. This could also provide substantial budgetary savings and greater credibility in the governance system.

Box 13

Different types of incentives

Institutional incentives refer to motivations created by institutional arrangements that promote transparency, cooperation, trust and participation on behalf of stakeholders. Adequate institutional arrangements are key to successful management outcomes; institutional failures – combined with inadequate legal frameworks – have been identified as main obstacles to effective conventional fisheries management practices.

Legal incentives include effective legislation that creates positive incentives, as well as negative ones in the form of significant penalty structures with effective enforcement capability. Clear and enabling legal arrangements that support the corresponding policy and institutional frameworks are key to successful EAF implementation.

Economic incentives, or financial incentives, arise from the need to address market failure and aim to establish a situation where economic actors and individuals chose to make more socially correct choices. These financial measures can be divided into two categories: market-based incentives (e.g. ecolabelling and tradable rights) and non-market-based incentives (e.g. taxes and subsidies).

Social incentives relate to the ways group behaviour and group interactions occur and form the context in which an individual makes decisions. Such incentives include moral structures, religious beliefs, peer pressure, gender relations, policy, social preferences, norms, rules, ethics, traditional value systems, social recognition, trust among the various stakeholders, and common interests.

The different types of incentives are further explored in FAO Fisheries Technical Paper No. 489 on the human dimensions of EAF.

2.5 Adopting a sustainable livelihoods approach

Moving toward an EAF may require a reduction or redirection of fishing effort making it necessary for fishers and fish workers to find alternative economic activities. Having alternatives to fishing that can generate income and food locally can reduce the pressure from individual households and communities to exploit local resources. When fishers and communities have few if any economic alternatives, it will be difficult to institute effective fishery management involving constraints on fishing, since the impacts of such decisions may be unacceptably severe.

Despite calls for a more holistic and integrated approach, conventional fisheries management practices have been largely unable – with some notable exceptions – to incorporate the development of livelihood

alternatives into fishery policy and management practices. While to some extent, this can be blamed on the over-emphasis within fisheries on the narrow "fish and fleet" perspective, there is often also a significant jurisdictional obstacle in place – the agency charged with fishery management may completely lack the mandate to consider measures, such as the creation of employment alternatives, outside the fisheries sector. Furthermore, the structures needed to coordinate among different sectoral agencies – e.g. community economic development plans or regional economic policies – could be lacking.

However, it should be noted that while the existence of livelihood/employment alternatives beyond the fishery could be a crucial factor in maintaining the health of a fishery and its ecosystem, the creation of such alternatives is difficult to accomplish in practice. If not already part of the local economy, it could involve a difficult economic restructuring process, including major investments, and changes of traditional practices. Furthermore, the sustainability over time of such alternatives is by no means assured. Thus, efforts to develop alternative livelihood opportunities must not be seen as a panacea to solving fishery problems. Nevertheless, the broadened perspective inherent in EAF requires a holistic approach to addressing the needs of individuals, households and communities and should support their development of sustainable portfolios of livelihood sources.

EAF in a context of poverty and vulnerability is discussed further in Part II, Section 5.

3. ADAPTIVE MANAGEMENT AND THE USE OF INDICATORS

3.1 Managing uncertainty

A fundamental consideration that must be dealt with in fisheries management – and possibly even more so when applying EAF – is the reality of uncertainty. Uncertainty arises due to unexpected changes to the system (e.g. floods, sudden increase in fishing pressure due to migration) as well as longer-term environmental variability and change linked to climate change or anthropogenic factors such as overfishing, mining and gas exploration. The key reality is a lack of predictability and the recognition that uncertainty is pervasive in fisheries – as well as in many other sectors – and may never be entirely resolved, has led to the adoption of the precautionary principle. The precautionary approach is acknowledged as a key underlying basis for incorporating uncertainty into decision making, so as to "err on the side of caution" (see page 3 and Article 7.5 of the Code).

However, while accepting that uncertainty will continue to be a significant part of reality, experience should allow for improving the ability to make decisions and adaptive management has already been mentioned in

these guidelines as an important component of the EAF process (see Part I). The concept of adaptive management was first developed in the 1970s as a way to address decision-making in a situation of uncertainty. It is a structured and iterative process which aims at optimizing decision-making and decreasing uncertainty over time. Adaptive management can be described as "learning by doing" and is – alongside the precautionary approach – a valuable method for addressing uncertainty when implementing EAF within a complex fisheries system. It allows for the incorporation of feedback from the fishery system in order to revise policy and management systems. Revisions are then followed by further implementation and experimentation, shaping subsequent policy and management actions. The *EAF Guidelines* are centred on an adaptive management approach.[35] Adaptive management can also be applied in a more active manner through undertaking carefully controlled experiments (e.g. applying particular management approaches to learn more about the system).

Adaptive management is not a single "tool" but rather an approach to the entire EAF management system; processes for adaptation can be incorporated from policy development through to fish stock assessment and enforcement. The idea is to ask, prior to implementing any given component of management, whether it can be modified easily, or even changed entirely, if and when new information becomes available that shifts fishery goals, structure or dynamics. Another aspect of adaptive management is "robust management" implying that the choice should fall on management measures that are relatively insensitive to uncertainty so that use of such management measures has a high likelihood of producing outcomes that are reasonably acceptable, even with limited knowledge of the fishery and ecosystem.

To make the adaptive management processes effective, it is essential that the management approach, including any "experiments" and their results, are appropriately documented. In this way, the use of adaptive management and learning processes will allow EAF systems to adjust and improve over time as new experiences and knowledge become available. Moreover, institutional culture and organizational structures need to be set in a way that allows for adaptive learning. For example, adaptive assessment can bring professional and lay stakeholders together, creating synergies and building knowledge based on the experience of each individual; however to capitalize on this process, the institutional structures need to be suitable for this type of interaction and able to adapt to the outcomes. In this context, "institutional structures" refer not only to the

[35] See, for example, Figure 1 and Section 4.1.6 in the *EAF Guidelines*.

institutions themselves but also to the rules and processes within the fishery and its ecosystem that facilitate the knowledge generation, information exchange and discussions among stakeholders that are needed in EAF.

3.2 Indicators

In order to effectively use an adaptive management approach, there is a need for a robust monitoring system providing information on the performance of the various components of the EAF policy and management system. There is hence a need to define and agree on indicators, reference points and performance measures. These are best formulated within a suitable integrated framework and following a logical process. FAO has developed guidelines on indicators for sustainable development of marine capture fisheries which can be used as the basis for an EAF monitoring framework, based on a *sustainable development reference system* (SDRS) (see Box 14).[36]

Box 14
The sustainable development reference system

The FAO Guidelines on the development of indicators for sustainable capture fisheries suggest that a *sustainable development reference system* (SDRS) is used. The related indicators will be derived in five steps:

(i) determining criteria, i.e. the components whose behaviour can be described by indicators and reference points, in relation to defined goals and objectives;
(ii) developing a framework for organizing the indicators;
(iii) specifying the indicators and reference points needed to assess progress in relation to the goals and objectives;
(iv) reviewing the feasibility, data availability, costs and other factors influencing the possibility to implement the indicator system in practice; and
(v) documenting the methods used for developing the indicator system.

In addition to the guidelines on indicators, the *FAO Fisheries Technical Paper* No. 489 on the human dimensions of EAF includes more information on the SDRS and other integrated indicator frameworks.

[36] FAO. 1999. Indicators for sustainable development of marine capture fisheries. *Technical Guidelines for Responsible Fisheries* No. 8. Rome, FAO. 68p.

Indicators are needed at different levels and stages of the EAF process and should be defined for goals, objectives and processes relevant to EAF policy, management plan and implementation. There are two types of indicators; outcome-based indicators that measure the degree to which goals and objectives have been achieved, and process-based indicators that focus on the efficiency of the processes used for achieving the results. Accordingly, the overall purpose of setting indicators in the EAF context is to assess whether the management measures carried out have had the intended and desired effect on the fishery system and its related ecosystem, and whether this has been done in an efficient manner. The *EAF Guidelines* discusses the process for selecting indicators and reference points for operational objectives, including a list of examples.[37] In Table 3, some examples of criteria that could be used for identifying indicators for different EAF dimensions are presented.

[37] See Chapter 4.1.4 and Appendix 4 of the *EAF Guidelines*.

Table 3. Examples of fisheries aspects from which sustainable development indicators can be developed

Dimension	Criteria
Economic	Harvest value Fisheries contribution to GDP Fish and fishery products exports value Investment in fishing fleets and processing facilities Taxes and subsidies Employment Income
Social	Employment/participation Demography Literacy/education Protein/fish consumption Income Fishing traditions/culture Indebtedness Gender distribution in decision-making
Institutional	Compliance regime Management and use rights Transparency and participation Capacity to manage
Ecological	Catch structure Relative abundance of target species Exploitation rate Direct effects of fishing gear on non-target species Indirect effects of fishing on trophic structure Direct effects of gear on habitats Biodiversity (species) Change in area and quality of important or critical habitats Fishing pressure fished vs. unfished area

Source: Adapted from FAO, 1999[36]

4. SUSTAINING AN EAF

4.1 Long-term process

Embarking on an EAF usually represents quite a significant shift in how to look at and implement fisheries management compared to any earlier management regime. As discussed in Part I of these Guidelines, more often than not, EAF is an evolutionary process – rather than revolutionary – and it

will build and improve on current fisheries management practices, when these exist. The details of and the speed by which management changes are introduced will depend on the specific local situation. Still, it is a long-term commitment and sufficient time has to be allowed for positive outcomes to be produced. Hence, sustaining the process in the longer-term becomes a critical issue.

Sustaining conventional fisheries management practices has often proven challenging in terms of:

- maintaining political commitment to difficult, sometimes long-term, courses of action;
- enabling legislative frameworks to support changing management measures; and
- ensuring adequate financing for the EAF management system.

These and other challenges can increase considerably with the adoption of an EAF due to the comparatively larger set of interests, issues, actors, and institutions as the scope of fisheries management is enlarged even in cases of limited geographic scale expansion. The *EAF Guidelines* lists a number of potential key impediments to EAF.[38] Several of these aspects have already been discussed in previous sections and this chapter summarizes a few of the more critical aspects of sustaining an EAF in light of its increased scope.

4.2 Political commitment and public awareness

A key factor required to sustain an EAF is political commitment. Obtaining such commitment is frequently linked to levels of awareness amongst politicians and civil society of the benefits of adopting a particular approach or supporting a particular initiative. The fact that EAF embraces a much broader approach than conventional fisheries management practices requires raising awareness across a number of sections and social groupings. For example, the policy domain for EAF may also draw upon coastal management, tourism, agriculture, industry, shipping and other policies besides fisheries policy at local, national, and even international levels. Each of these policies will have their own policy processes and sets of stakeholders with various and perhaps competing or conflicting interests.

Maintaining political commitment over time, including where appropriate through several electoral cycles or through difficult circumstances, is essential to sustain an EAF. This is the only way in which human and institutional capacity can be built and sustained and the EAF mainstreamed. Depending on the governance arrangements and the scale of EAF implementation, this may involve constantly renewing the "buy-in" at

[38] See Chapter 6 of the *EAF Guidelines*.

different levels of government and other relevant entities as various problems arise and their solutions impact positively or negatively on different groups at different times. An even more critical situation is one in which the positive and negative impacts associated with implementing an EAF are not evenly distributed (see also Part II, Section 1). The policy and planning process needs to address such inequity. Situations can become highly politicized, however, if certain groups are to remain disadvantaged or are to be highly compensated for their displacement or disadvantage associated with EAF implementation. Managers need to be able to act efficiently in the political arena in order to speak for EAF in the face of political pressures or even threats.

Policy-makers are generally expected to respond to the concerns of their constituents, so a large part of garnering political commitment is ensuring that the public and special interest groups in the political domain are aware of the benefits and needs of sustaining an EAF, including the need to make reasonable sacrifices. Points to consider in this regard are:

- political will and commitment may be determined in part by the quality and communication of scientific and technical advice on EAF;
- policy advice from fisheries authorities should be politically sensitive to prevent policy makers from feeling the urge to seek advice elsewhere;
- obligations in international instruments that support EAF being maintained should be highlighted; and
- a diversity of stakeholders needs to be involved in EAF as this typically results in better outcomes and restricts the degree of political polarization that may develop.

4.3 Legal flexibility and harmonization

The need for an enabling legal framework to support EAF was discussed in Part II, Section 2. As mentioned above, when discussing adaptive management (Part II, Section 3), the legal framework needs to be flexible and responsive to various changes, including changes in the knowledge base and changes to the biological, ecological and socio-economic systems. At the same time, the primary fisheries legislation should, as far as possible, not be subject to frequent modifications. One means of responding to both these needs is to enact a national-level, primary legislation that lays down principles and policies, that is generally broad in scope, and which would specify the "functions, powers and responsibilities of government or other institutions involved in fisheries management".[39] This legislation could also reflect varying degrees of detail with respect to implementation, such as the

[39] Page 63 in the *Fisheries Management Guidelines*.

main features of a specific mechanism (e.g. procedures for the allocation of fishing (use) rights). The dynamic nature of the fisheries and its interactions with other sectors may be captured through agreed rules and other legal means.

As ecosystems are often covered by several overlapping legal regimes (e.g. maritime, forestry, water, agriculture), and also frequently overlapping national legislations, there is a need for harmonization between fisheries legislation and the other sectors' sets of legal instruments, both within and among nations. This could constitute a long process and needs to be planned for in the EAF.

4.4 Financing of EAF implementation

As discussed in Part II, Section 1, there are costs and benefits of EAF. While the long-term benefits are expected to be substantial, they may occur at a scale and with a timing that do not necessarily match the costs of implementing the EAF process. There will be a number of costs with direct financial implications for the implementing agency (e.g. operating expenses for participatory meetings and consultations, research and data handling, monitoring and observers, economic incentives), that – although outweighed by benefits in the form of increased ecosystem services and values – in practice, need to be funded. This is particularly true at the beginning when embarking on an EAF when new processes and systems need to be developed and set up, but the need for funding of activities will remain throughout EAF implementation.

This need for sustainable funding for the fishery management system is not unique to EAF; conventional fisheries management practices also require a budget. Since EAF implies a broadening of attention in fisheries management beyond simply fish stocks and fishing fleets to matters relating to aquatic ecosystems and related human systems, there is often an assumption that the costs of implementing EAF will be higher than under conventional management. While there should certainly be attention paid to financing the introduction of new approaches, this is not necessarily the case for the process as a whole. Recognizing that the EAF is an approach rather than a strict recipe to be followed, it can be either costly or inexpensive depending on the extent of its implementation. While some fisheries may embark on a major shift to EAF management, changing processes from data collection through to institutional design, in other fisheries (notably data-sparse small-scale fisheries), a low-cost EAF implementation that is less demanding of financial and human resources may be more suitable. An important task for EAF managers is to assess the need for funding – both in the short-term and long-term – and ensure that mechanisms are in place for securing the necessary budget. This assessment work will also feed into the decision-making process regarding several

aspects of the EAF in question, i.e. the scope and management measures opted for have to be commensurate with the capacity of the EAF to generate or attract funding in the longer-term.

In general, there are three main sources for funding EAF:

- from the state treasury, through the budget allocations to the fishery agency responsible for EAF coordination and management, and by contributions from other relevant government entities involved in the process;
- from internal cost-recovery mechanisms such as "user pays" or "polluter pays" systems; and
- from external funding.

In practice, an EAF is likely to draw on a combination of these funding sources.

At the same time as EAF may require increased funding – at least initially – it should be possible to streamline financing and increase cost-effectiveness compared to conventional fisheries management practices by sharing EAF costs across economic sectors. This is also a distinguishing feature of broadening an EAF into an EA (ecosystem approach) more generally and including tourism, forestry, conservation, agriculture and other sectors as applicable. Introducing and sustaining EAF may then become more affordable. Of course, in order to accomplish this, there should be strong, integrated and highly cooperative institutional relationships among the sectors, such that certain stakeholders do not become free-riders or part of the social costs of implementing the EAF if they are antagonistic toward it.

In cases where the fisheries sector receives relatively little of the national budget, it is important that it develops allies with the wealthier or more politically prominent sectors so as to maintain funding levels. Such alliances include social partnerships also with the private sector and NGOs for projects ranging from habitat restoration and ecotourism to innovative ecologically responsible investments that are beyond the scope of national public financing.

Financing EAF implementation through "user pays" and "polluter pays" approach involves collecting revenues from those using the natural resource or causing ecosystem or resource damage and using those funds to finance the move to EAF. In addition to the polluter-pays and user-pays incentive mechanisms within fisheries, governments and fisheries associations have begun reclaiming the restoration costs in dealing with ecosystem damage inflicted by actors outside of the fishery sector (e.g. upstream activities causing changes to habitats and pollution through destructive practices). Individuals convicted of damaging are required to either pay fines, which may or may not be directly related to damage costs, or more directly to

repair the damage or pay for work related to the conservation and protection of the affected habitat. Note that related to the concept of "polluter pays" is the idea of "beneficiary pays". This implies that those receiving the benefits of EAF implementation should pay at least some, if not all, the costs required for creating those values (see Box 15 on payments for environmental services[40]).

Identifying appropriate sources of external funding to sustain an EAF and understanding the funders' requirements requires a large and, perhaps, daunting investment on the part of EAF managers. For example, some funding sources may target sectoral-specific activities, while others may target specific issues, such as biodiversity or MPAs. Procedures for applying for funding, accounting systems and even vocabulary may vary significantly across funding sources and recipients of such funding may be tied to certain conditions, economic or otherwise.

In addition, as an EAF is likely to comprise both development and conservation components, no one source of funding is likely to cover all EAF needs. Hence, a portfolio approach to funding will be necessary; increasing the time and energy devoted to developing funding proposals and using these funds. Furthermore, there is the crucial issue of institutional sustainability to consider when utilizing external funds – i.e. ensuring that long-term arrangements are in place so that EAF implementation is not jeopardized when the specific funding period ends.[41]

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[40] PES are also sometimes referred to as "payments for ecosystem services" (see FAO. *The State of Food and Agriculture*. 2007. Rome, FAO. 240p.).

[41] A longer discussion on funding of EAF – including external funding options – is included in the *FAO Fisheries Technical Paper* No. 489 on the human dimensions of EAF.

Box 15
Payment for environmental services (PES)

The emerging policy approach of payments for environmental services (PES), used predominately in the agriculture sector and in the context of land use, is a market-based economic instrument that can involve both the private sector and the government. It strives to give environmental services an economic value that reflects the real social, environmental and economic benefits in order to encourage an increase in their production; versus a situation in which providers of environmental services tend not to be compensated and users do not pay. One reason for the political interest in PES is that many of the providers of environmental services are poor population groups – farmers – and the approach may offer an avenue for combining ecosystem conservation with poverty alleviation.

Source: FAO. 2007. *The State of Food and Agriculture. Paying farmers for environmental services.* Rome, FAO. 240p.

5. SPECIAL REQUIREMENTS OF DEVELOPING COUNTRIES AND EAF IN A POVERTY CONTEXT

In the Code (Article 5) and the *EAF Guidelines*, the special requirements of developing countries with regard to fisheries management and EAF implementation are recognized. There is a challenge in introducing improved fisheries and ecosystem management systems in situations where capacities are limited as is often the case in developing countries. Small-scale fisheries, common in developing countries, are often data-poor and require assessment and management approaches different from those generally applied in large-scale fisheries. Moreover, particular problems with implementing EAF are likely to be encountered where poverty is widespread and when short-term costs cannot be easily assumed in order to gain longer-term benefits.

As discussed in Part I, Section 1, poverty in fishing communities is generally a complex issue. The contribution of small-scale fisheries to poverty alleviation and food security is significant and the sector also often plays an important role in poverty prevention. Overfishing and potential depletion of fishery resources constitute a threat to many coastal livelihoods but socio-institutional aspects are also central in determining poverty. Hence, in order to achieve sustainable poverty reduction, the questions of how and by whom access to and use of fishing grounds are controlled need to be addressed.

This situation has important consequences for implementing EAF in the context of small-scale fisheries and poverty. Addressing poverty and

achieving equitable results require that marginalized groups are included in the institutional processes related to the EAF. However, due to social exclusion and vúlnerability, fishing people may lack the capacity and incentive to effectively participate in an EAF. New institutional approaches, capacity building and incentives are hence likely to be needed to ensure a successful EAF.

Another potential key challenge for small-scale fisheries in applying EAF is dealing with impacts caused by factors beyond their control, or outside their territories, such as pollution and habitat destruction from land-based activities, destructive practices of non-fishery activities within aquatic environments (e.g. impacts of oil exploration and extraction and offshore mining activities), and destructive fishing practices by large-scale fisheries. For example, if industrial fishing vessels encroach on inshore areas previously only used by traditional fishers, in order to make up for a shortage of resources in their original territory, possible implications include a reduction of resources, damage of habitats, destruction of fishing gear and even human casualties.

Under such a scenario, the scale and boundaries of the EAF have to be carefully considered, ensuring that all relevant stakeholder groups are identified. In order to be successful in reconciling resource management with sustainable livelihoods, the EAF needs to address the real concerns of small-scale fishers and fish workers. If, for example, safety-at-sea is a concern with regard to artisanal fishers, support to introducing safer practices could be necessary. If the encroachment by large industrial vessels is an issue, the monitoring, control and surveillance (MCS) system should be reviewed, requiring consultations with the competent authorities. Where there are differences in power between different stakeholder groups - e.g. between small-scale and large-scale operators – conflict resolution may become a key component of the EAF process.

As discussed in Part II, Section 2, co-management is increasingly considered as key approach to fisheries management as well as EAF. So far, most attempts to implement co-management have been focused on the management of fish stocks and it has been assumed that poverty reduction would be achieved by improving the state of the fishery resources. This approach generally requires a reduction in fishing activities, leading to long-term gains but requiring cuts in income in the short-term. If no benefits are generated in the short-term, there is limited incentive for fishers to participate. If there are no alternative employment opportunities, it may not be possible for poor household to comply with the management regime. In a situation with poverty and high levels of vulnerability, the future may be heavily discounted implying insufficient incentive for cooperation of communities for long-term resource sustainability gains.

Various incentives available to EAF were discussed in Part II, Section 2. In the context of small-scale fisheries and poverty, an approach to create the necessary conditions and incentives to ensure an equitable participation of stakeholders in an EAF, and at the same time address poverty, is to embed the EAF management in a broader development context. An EAF co-management structure then needs to be created that allows for mobilization of resources and services in support of other aspects of people's livelihoods in addition to resource management. The Sustainable Fisheries Livelihood Programme (SFLP)[42] implemented this approach in two pilot projects in West Africa (see Box 16).

Such an approach would be in line with EAF principles addressing both human and ecological well-being. Solutions to marine conservation will have to be socially acceptable and just and be effective from both biodiversity and livelihood perspectives.

Box 16
Co-management by SFLP

SFLP combined the Sustainable Livelihoods Approach (SLA) with support to the introduction of more sustainable fishery resource management as laid down in the Code. As a result, the Programme demonstrated that the short-term costs of introducing co-management can be offset by investing in poverty reduction. By creating incentives for communities to participate in co-management and building their capacity for doing so effectively, synergy effects are achieved. However, this requires that co-management programmes are moved beyond the focus on regulating access to fishery resources, and to a wider community perspective by which community-based fishery management organizations become local development organizations. Extensive collaborative networks are required and the fishery management cum local development structures need to work in partnership with local government service providers and other stakeholder groups (including health care providers, private micro-finance organizations, business advisory services, education providers and so on) to address both poverty reduction and responsible fisheries.

Source: Njock, J.-C., Angaman, K. and Allison, E.H. 2009. Chapter 5: Institutional innovations in fisheries co-management in West and Central Africa. *In*: Westlund, L., Holvoet, K. and Kébé, M. (eds). Achieving poverty reduction through responsible fisheries: strategies and lessons from the West and Central Africa Sustainable Fisheries Livelihoods Programme. *FAO Fisheries Technical Paper* No. 513. Rome, FAO.

[42] SFLP was implemented in 25 countries in West and Central Africa by FAO with funding from the Department for International Development of the United Kingdom (DFID) from 1999-2006.

PART III – EAF IN PRACTICE

1. THE EAF PROCESS

The typical EAF process was described in the *EAF Guidelines* and briefly reviewed in Part I at the beginning of this document. In the preceding chapters, the EAF context and a number of key social, economic and institutional concepts and mechanisms have been discussed.

In this third part of the document, the various concepts and mechanisms will be pulled together and put in the context of how to operationalize an EAF. While recognizing that the paths into EAF vary (see Box 3) and that the process (as depicted in Figures 3 and 4) is iterative, the planning and implementation of an EAF will be discussed according to the following main steps:

- Initiation and preparation
- Formulation of EAF policy and identification of issues
- Development of a management plan and operational objectives
- Implementation
- Monitoring and evaluation

These steps – in particular the key component of management plan development – are also described in the *EAF Guidelines* and in the *Fisheries Management Guidelines*. The structure of the presentation here differs somewhat from earlier guidelines and certain aspects are explored in some further detail, e.g. with regard to the preparatory work and policy formulation. Moreover, the present guidelines, in this third part in particular, also attempt to take into consideration developments after the publication of the *EAF Guidelines*, e.g. the ongoing work on identifying and designing tools for EAF implementation[43] (see also Part III, Section 0). However, as mentioned in Part I, the overall rationale and sequence remain the same as in the two earlier guidelines.

[43] More information on already identified tools and methods is available in the *FAO Fisheries Technical Paper* No. 489.

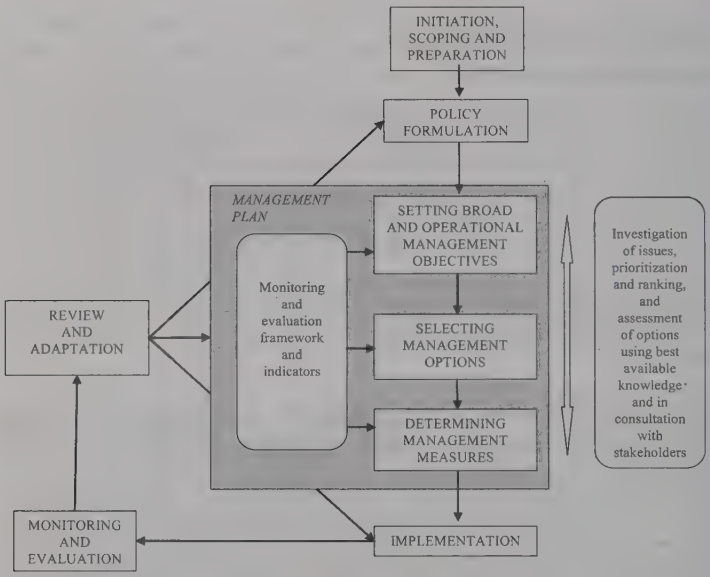
INITIATION, SCOPING AND PREPARATION
POLICY FORMULATION
MANAGEMENT PLAN
SETTING BROAD AND OPERATIONAL MANAGEMENT OBJECTIVES
Monitoring and evaluation framework and indicators
SELECTING MANAGEMENT OPTIONS
DETERMINING MANAGEMENT MEASURES
REVIEW AND ADAPTATION
Investigation of issues, prioritization and ranking, and assessment of options using best available knowledge and in consultation with stakeholders
MONITORING AND EVALUATION
IMPLEMENTATION

Figure 4. Steps in the EAF process

2. INITIATION AND PREPARATION

Whatever the path into EAF is, and independent of the existing fisheries management situation, the first activities of any EAF process will concern planning and preparations. The purpose of this first step is to gather initial information and to plan a participatory process consistent with the context (cultural, resources available, types of fisheries, etc.). It will also include the definition of the scope and scale of the EAF, and the development of a common understanding of what the current situation is and what the potential issues are.

As mentioned in Part I, an EAF can be initiated at a variety of levels and by different stakeholder groups. However, the responsibility for coordinating and implementing the EAF generally remains with the competent fisheries management authority. The EAF coordinators will need to establish an initial EAF process plan and ensure that the necessary basic resources for carrying out the process are available. Human resources are a key element and the EAF team should contain the necessary multidisciplinary and technical capacities as well as have the ability to bring about collaboration with partners and stakeholder groups. This means constructing an EAF team consisting of scientists and practitioners including, *inter alia*, sociologists, anthropologists, economists and

biologists, preferably with interdisciplinary capacities. There is also a need for process-oriented skills such as facilitation, negotiation and change management. It is important to ensure that all relevant disciplines are integrated in the process, i.e. for planning and preparation, policy formulation and identification of issues, management plan development, implementation, and monitoring and evaluation. The formal integration of all EAF disciplines will reduce the cost of management and make the EAF process more effective than if kept separate.

There may also be a need for establishing a specific mechanism for intersectoral coordination. Depending on the scope and scale of the EAF and on the composition and mandate of the EAF team, an intersectoral advisory group or committee could be needed to support and coordinate the work at a higher political and administrative level. Such a group or committee would include representatives from relevant government agencies as well as key nongovernmental organizations and the private sector.

The identification of stakeholders – by the conduct of a stakeholder analysis – is a key activity at the beginning of the EAF process. This exercise will widen the group of individuals, organizations and agencies that should be consulted and involved beyond the EAF team and immediate partners. Further along the EAF process, these stakeholder groups may expand or change. Establishing rules and institutional structures for how different stakeholders engage and participate in the EAF is fundamental for its implementation.

It is also critically important to ensure that there is a common understanding among stakeholders of what EAF means in the context of fisheries management, so that policy and management measures that are subsequently developed are informed by the underlying concepts. The EAF plan needs to have clear objectives and should define the EAF principles that it is based on. In conjunction with defining the scope and scale of the EAF, the coordinators have to be clear about what they intend to achieve and ensure that this view is shared with key stakeholders and the EAF team members. Early on in the process, this perspective should be communicated and discussed with the wider group of stakeholders and the public. It is likely that efforts and resources will have to be allocated to raising awareness and building capacity as part of the EAF communication strategy (see also Part I, Section 2).

Initial stakeholder consultations should identify main societal goals and the interests and objectives of different groups. These should be shared, recognizing that the perceptions and aspirations of different groups may sometime appear difficult to reconcile and require repeated facilitation and negotiations. Once the understanding that a reconciliation of views is required is created, objectives can be developed into a common vision for

the EAF. A vision is a description of the ideal state of the fishery and its ecosystem that stakeholders aspire to, both in terms of its biological status and in terms of their socio-economic circumstances and governance arrangements, and constitutes a basis for policy formulation (see Box 17).

Box 17
Example of a vision: small-scale fisheries

"The vision for small-scale fisheries is one in which their contribution to sustainable development is fully realized. It is a vision where:

- small-scale fisheries are not marginalized, and their contribution to national economies and food security is recognized, valued and enhanced;
- fishers, fishworkers and other stakeholders have the ability to participate in decision-making, are empowered to do so, and have increased capability and human capacity; thereby achieving dignity and respect; and
- poverty and food insecurity do not persist; and where the social, economic and ecological systems are managed in an integrated and sustainable manner; thereby reducing conflict."

Sources: FAO. 2005. Increasing the contribution of small-scale fisheries to poverty alleviation and food security. *FAO Technical Guidelines for Responsible Fisheries* No. 10. Rome, FAO. 79p. See also Béné, C., Macfadyen, G. & Allison, E.H. 2007. Increasing the contribution of small-scale fisheries to poverty alleviation and food security. *FAO Fisheries Technical Paper* No. 481. Rome, FAO. 125p.

A "scoping exercise" is another element of the initial preparatory phase. This entails a preliminary collection and consolidation of basic information on the fishery system and the related ecosystem as defined by the agreed scope and scale of the EAF. The types, sources and methods of data collection were discussed in Parts 1.1 and 1.2. At this stage, a background document that can be expanded and elaborated on further is required and will help the EAF team to understand the potential critical issues that the EAF should deal with. The issues and concerns identified in the consultative process should also be taken careful note of and will together with the vision form the basis for developing EAF policy and, subsequently, a management plan. Tools for identifying and prioritizing issues that can be used at different stages of the EAF process were discussed in Part II, Section 1.[44]

[44] See also the Chapter 4.1 of the EAF Guidelines, the Fisheries Management Guidelines and the *FAO Fisheries Technical Paper* No. 489 (Chapter 6).

In summary, the outputs of the EAF "initiation and preparation" step are an EAF team, a detailed process plan, a preliminary mapping of stakeholders, plans for participation and communication, a draft scoping document (i.e. a summary of the nature of the fishery system and its context) as well as an initial list of potential issues and a vision statement. Box 18 gives a list of activities that are likely to be included in the preparatory phase. However, these do not follow a strict chronological sequence; the process is likely to be iterative and interactive.

Box 18
Activities for EAF initiation and preparation

- Elaborate overall EAF process plan (main components, time, budget).
- Construct EAF team based on identification of key requirements (e.g. facilitation and communication skills, planning expertise, social science, fisheries expertise, systems thinking) and make arrangements for intersectoral coordination.
- Define the scope and scale of the EAF (geographic and administrative boundaries).
- Conduct initial Stakeholder Analysis (definition, mapping, power relationships).
- Publicize EAF initiative for self-identification of stakeholders and interested parties.
- Identify key stakeholders for first workshop to ensure the credibility of the process and organize introductory consultations (independently and at multiple levels).
- Review overarching societal goals and identify interests and objectives of different stakeholder groups and share these in a way that informs but does not constrain the process.
- Identify rules for stakeholder engagement in the EAF process.
- Prepare a communication plan (including the setting of expectations, plans for feedback loops in planning process, forms of communication to be used and needs for capacity building).
- Investigate relevant aspects of the fishery system and the relevant ecosystem and prepare background documentation, including on the policy, institutional and legal frameworks (covering also an assessment of management and research capacity), and the socio-economic context.
- Based on stakeholder consultations and context review, draw up a preliminary list of issues to potentially be dealt with in EAF policy and management and draft a vision for the EAF.

3. IDENTIFICATION OF PRIORITY ISSUES AND FORMULATION OF EAF POLICY

This step comprises a further elaboration of the preliminary scoping exercise and the definition of policy options and goals. However, as mentioned earlier (see Part I), in most cases, the move toward EAF is incremental and is unlikely to involve wholesale scrapping of existing policies and management frameworks. Although it may be appropriate and desirable to formulate entirely new policies in some cases, it is more likely that there will be a gradual review and modification of existing policies.

The setting of goals requires input from all relevant stakeholder groups and is informed by an analysis of the information collected on the fishery system, its policy, institutional and legal frameworks and socio-economic context. The issues identified in the preparatory phase and the vision statement provide the general framework for the policy formulation (see Box 19). The process for identifying goals will vary depending on the scale of the EAF (e.g. LME versus local level) and may require several iterations to ensure that the goals identified do in fact represent stakeholders' priorities. There will also be a need for continual reference to the EAF principles to ensure conformity. It should be recognized that the setting of priorities will be also influenced by other factors, such as macro-economic policies of the country, the particular focus of the current political regime or commitments that have been made in terms of international agreements or conventions.

Typical policy level goals could include statements relating to fishery rights and access (management and use rights), priorities given to different fishery subsectors or the role the fisheries sector should play, for example, economically or for creating employment opportunities – locally or in the region – and of course outline biological and ecological goals with regard to desired states of fishery resources or ecosystems. At times, the existing legal framework may not support the policy change that EAF entails. In such cases, EAF coordinators have to investigate the possibilities of revising relevant legislation (see Part II, Section 2).

The output of the policy formulation process will be a policy document. This document should be made available to all stakeholders and the public in general in order to ensure transparency. It should also be remembered that policies are not static instruments but need to be reviewed regularly, incorporating relevant developments and experiences gained.

Box 19
Issues and concerns to be addressed by EAF policy

There is likely to be a range of issues for potential consideration in EAF policy, reflecting the different values, interests and goals of the various stakeholder groups.

For example, at an LME level, these issues may include the decline in transboundary stocks and impacts of other sectors (e.g. off shore oil and gas exploration on marine resources), the impact of climate change on marine ecosystems or the need for common management procedures for determining measures such as Total Allowable Catches (TACs).

At the country level, issues may also be diverse and include concerns such as the allocation of resources across various fishery sectors (e.g. large-scale and small-scale), the impact of certain gear types on marine species, the state of shore-based facilities for small-scale fishers, the impact of broader threats (e.g. HIV/AIDS on coastal communities), food security and sustainable livelihoods options, or the impact of alien invasive species on local fish populations.

Concerns about governance issues such as a greater involvement of resource users in management decisions may also be raised.

All these issues represent real issues for stakeholders and need to be investigated in order to identify the priorities around which policies should be framed. Adoption of EAF requires that a wide range of issues be considered, and that issues of most concern to society and government be addressed.

4. DEVELOPMENT OF AN EAF MANAGEMENT PLAN AND ITS OBJECTIVES

The EAF management plan provides a mechanism to support the implementation of desired policy directions. Thus, while the policy level is *strategic* in nature, a management plan is at the *practical* level of specifying the objectives and actions needed to achieve the broad goals of a fishery or an associated ecosystem, and which, in turn, provide the inputs into the subsequent *operational* aspects of implementation. The development of the management plan is a key step in the EAF process and will include the setting of management objectives, selecting management options and determining management measures (see Figure 4).[45] The management plan should also contain indicators and performance measures and outline

[45] See also Section 4 of the *EAF Guidelines*.

monitoring, assessment and review processes and these aspects are discussed in Part III, Section 6.

An EAF management plan is designed along similar lines to a management plan that might be developed within a government department, NGO or private business in order to meet policy goals. The essential idea is also similar to that of a conventional fisheries management plan but the suite of fisheries management tools proposed in an EAF management plan should be explicitly linked to the principles and practice of EAF.

Generally, the stakeholder analysis carried out as part of the initial preparations would need to be refined at this stage. It is also advisable to identify a few individuals who could represent the interests of larger stakeholder groups, and who would interact with the EAF managers on an ongoing basis. Special attention should be given to ways of identifying and involving poor and marginalized groups and individuals who may not respond to mainstream announcements of opportunities for public involvement. Including poor and food insecure fishers and fish workers in the management processes is likely to improve the potential for pro-poor content of the EAF and address potential inequitable distributional effects. There may be a need to provide capacity building and training to ensure that all stakeholder groups have equal opportunities to participate in the EAF (see also Part II, Sections 1, 2 and 5).

Management level objectives are more narrowly expressed than policy goals and are generally defined at two levels: broad management objectives and operational objectives. The *broad objectives* state the intended outcomes of the EAF management and constitute the link between the policy goals and what a specific EAF management is trying to achieve. The *operational objectives* are more specific and have direct and practical meaning for the fishery system that is being managed. They should be measurable and linked to specific time periods.

The real challenge is not simply to list all objectives but to prioritize them in order to reflect the reality of limited resources and the fact that some objectives will be considered more important than others. In order to do so, there is a need to further investigate and prioritize the underlying issues and concerns. This may involve simply providing a consolidated list of all issues raised and grouping them under common headings, with a brief description of all the issues based on currently available information. However, more often, investigations should involve follow-up discussions with stakeholder groups. In order for stakeholders to make informed judgments regarding priority issues and which of the available options might best serve societal needs and goals, information about their potential impact (e.g. effectiveness and distribution) and other consequences (e.g. costs/benefits and political implications) needs to be gathered and made available. There are various methods that can be used to assist in this

process and the approaches for assessing costs and benefits and associated risks, as described in Part II, Section 1, are useful tools in this respect.[46]

To achieve the objectives, choices have to be made regarding the specific EAF management tools to be used. These measures can include technical measures (e.g. gear regulations), spatial and temporal controls (e.g. MPAs and closed seasons), and input (effort) and output (catch quota) controls[47] as well as incentives and other mechanisms discussed in Part II, Section 2. In deciding which measures and instruments to use, the impacts and effectiveness of the different options need to be assessed and analyses of costs and benefits is a key approach here. For example, suppose that a policy decision has been made to adopt a participatory co-management approach in a particular fishery. Whilst there are clear benefits to this approach, there are also likely to be cost implications in terms of the time and expenses. Decisions may have to be made in the context of the management plan to determine a specific form of participatory co-management that achieves a desired balance among these costs and benefits. Depending on the specific context, some options being considered for a management plan may turn out to have excessively large cost implications whatever the potential benefits (e.g. implementing a multispecies quota system, as a means to deal with bycatches and species interactions, may be financially infeasible in many circumstances), while other options might be seen as "win-win" options (e.g. using a suitably inexpensive device to reduce unwanted bycatch while simultaneously reducing fishing costs).

The distributional implications of a management option are additional key factors to consider. In some cases (e.g. the establishment of certain MPAs) the aggregate benefits may clearly outweigh the costs, but the distributional impacts of the measure may be a critical issue, i.e. inequities in impacts across stakeholders, with some benefiting greatly while others incur a disproportionate fraction of the costs (see also Part II, Section 1).

As it is likely that there are divergent stakeholder interests, it is inevitable that hard choices will have to be made and key issues that often arise are: (i) Who ultimately determines which objectives and management options are the preferred ones?; and (ii) What are the criteria that ultimately inform such choices? In order to arrive at an effective management plan, compromises often have to be made. In fact, it is likely that there is no optimal route satisfying everybody's wishes but "second best" - to

[46] More information on these is found in the *EAF Guidelines*, the *Fisheries Management Guidelines* and the *FAO Fisheries Technical Paper* on the human dimensions of EAF. Additional information is available in the FAO Technical Guidelines on Information and knowledge sharing (No. 12, Rome, 2008, 97p.).

[47] See Chapter 3 in the *EAF Guidelines*.

everyone – management options may be the solution. In order to arrive at acceptable compromises, extensive negotiations may be required combined with facilitation methodologies, e.g. scenario exercises and analyses of risks and uncertainties (see Part II, Section 1). If consensus cannot be reached, the decision-makers may need to call in a skilled negotiator or they may decide to make the final choices without further reference to the participatory process. However, care should be taken not to ignore any minimum requirement defined by stakeholder groups when settling for a "second-best" management option.

In addition to specifying management measures, it is fundamental that the management plan includes the necessary institutional details for implementing the EAF processes that have been chosen. It also has to be ensured that the preferred management options are supported by the existing legal framework. For example, if a policy decision was made to involve stakeholders in management, then the management plan would need to clarify the degree of such co-management, the roles and responsibilities of the participants and guidance for the institutional structure and functioning. The legal framework needs to allow for delegation of management authority to co-management groups. If not, it will be difficult to implement the management plan until a legislative revision has taken place (see also Part II, Section 2). Box 20 gives a summary of key activities that are likely to be included in the process of developing an EAF management plan. As mentioned at the beginning of this chapter, the selection of indicators and reference points, which is also an important part of the management plan, is discussed in Part III, Section 6.

5. IMPLEMENTATION

The management plan specifies choices of management options and management measures that are considered suitable to achieve the objectives set at the beginning of the process – objectives for management that build on broader policy goals and indeed overall societal goals. Once the various choices have been made, there remains the challenge of implementation.

While in conventional fisheries management practices, implementation may have been carried out by the government fisheries agency alone, EAF management generally involves a broader institutional set-up including collaboration with parties outside the fisheries sector. Even within the fisheries sector, the stakeholder groups are likely to be more numerous and diverse and this reality may require a review of the institutional structure. Due to the broadening of the management scope, support from higher levels within the national administration and political arena – and from other partners, e.g. NGOs and private sector – for coordination and provision of the resources necessary for implementation will be desirable. A need for

capacity building and training of staff should be expected in order to ensure a thorough understanding of the EAF concept.

Box 20
Activities for developing an EAF management plan

- Build on the initial scoping exercise and compile and analyse background information.
- Refine the Stakeholder Analysis and establish a system for stakeholder representation in EAF planning and decision-making.
- Cross-validate views from stakeholder consultations with analysis of available information.
- Investigate and prioritise the identified issues to be managed in the EAF process and analyse the relationships among issues (e.g. interactions among issues and their relationship with policy goals and management objectives).
- Define broad and operational management objectives based on analysis of issues and options (costs and benefits, risk assessments) and stakeholder consultations.
- Determine the hierarchy of objectives and clarify what criteria will be used to decide in this process, if required.
- Define management measures based on analysis of issues and options (costs and benefits, risk assessments) and stakeholder consultations.
- Define institutional arrangement for implementing the management plan.
- Review management objectives and measures to ensure that they are not inconsistent with legislation.

As with the other steps discussed in the EAF process, the implementation details will be situation specific but successful EAF implementation is likely to depend on (see also Parts 2.2 and 2.4):

- political commitment;
- appropriate legal and institutional frameworks that enable practical implementation;
- capacity and skills, both with regard to human resources and equipment;
- cooperation across relevant sectors and departments;
- ongoing stakeholder support; and
- appropriate funding, especially when substantial new processes and systems need to be established.

In practice, some of the tasks to be performed by the EAF managers and other staff may be similar to those carried out previously if a conventional fisheries management plan had been in place. When developing a detailed EAF task implementation plan, a careful review of what needs to change, what needs to be done in addition and what does not need doing any longer should be carried out. Difficult choices may be needed, particularly in an environment of limited resources. The roles and responsibilities as well as resources needed for undertaking each task and activity should be clearly identified. Operational plans for each partner or group, e.g. research group, compliance group, information management unit, should be put in place. Procedures and systems need to be updated according to the new EAF management and implementation plan.

Likewise, the MCS functions need to be reviewed and changed as required. These will depend on the scope of the EAF and the management measures that are used, as is also the case under conventional fisheries management practices. However, EAF will address a wider scope of ecosystem elements and may also use a wider range of management measures. Observer schemes (e.g. for bycatch and discard monitoring), vessel monitoring systems (VMS; e.g. for control of closed areas and MPAs) and means for patrol and enforcement are examples of possible MCS components.

Communication and transparency are key aspects of EAF operational implementation. Information on the development of the fishery and its EAF management system has to be made available and communicated to all directly concerned. Although the fishing industry and fishers will have been involved in the participatory process of establishing the EAF management plan, there will still be need for meetings and information sharing with all relevant parties.

6. MONITORING AND EVALUATION

An EAF requires a suitably integrated and interdisciplinary approach to monitoring and evaluation and a system for review and adaptation needs to be built into the process. Depending on the particular situation and local conditions, the monitoring and evaluation package will vary from one EAF to another. There are a number of different approaches that can be used including participatory methods and performance indicators. As mentioned in Part II, Section 3, indicators and reference points are commonly at the

core of a monitoring system and should be defined within an overall framework that will allow for adaptive management.[48]

Box 21
Summary of key points in EAF implementation

- Seek regular confirmation of political commitment by disseminating relevant information on developments to key agencies and individuals and organise meetings, seminars or similar directed to the political establishment.
- Continue the participation of stakeholders and ensure that implementation processes are consultative and transparent.
- Make appropriate use of intersectoral advisory groups and committees and create additional such structures if and when needed.
- Budget sufficient funding allowing for the necessary human and other resources to guarantee accurate and timely implementation.
- Ensure that staff are appropriately trained and posses the required understanding of the EAF process to be able to flag constraints and problems in the implementation process.
- Implement a communication plan and disseminate results and developments to key stakeholders and general public as appropriate.
- Establish a formal monitoring system allowing for timely and accurate feedback on progress in relation to goals, objectives and targets.

While monitoring and evaluation are essential aspects of any fisheries management system, there are particular challenges in EAF management, due to the increased scale and scope involved. In other words, it becomes necessary to monitor not only the narrow aspects of a specific fish stock and the fishers exploiting it, but also the state of the aquatic ecosystem, interactions with and impacts on other uses of that ecosystem, and relevant human dimensions, including the dynamics of fishers, fishing communities, and the surrounding socio-economic environment. Furthermore, both the scope and the criteria for evaluation must be broadened to allow for the reality that additional objectives, both ecosystem-oriented and multiuse related, are being pursued.

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[48] See FAO. 1999. Indicators for sustainable development of marine capture fisheries. *Technical Guidelines for Responsible Fisheries* No. 8. Rome, FAO. 68p. For more information on monitoring and evaluation tools, methods and approaches, see also, for example, the web page of the Independent Evaluation Group (IEG) of the World Bank. Available at www.worldbank.org/ieg.

There are many different criteria and types of indicators that may be of interest within an EAF framework. The policy document and management plan should specify indicators and reference points for all goals and objectives. These will hence range from reflecting broader sustainability issues at the policy level, e.g. social, economic and institutional targets derived from the Millennium Development Goals (MDGs), to more basic measures of fish catches and exports, fishery employment and revenues, and fishing community welfare, as well as attributes such as ecosystem health and community resilience. It is also desirable to include performance monitoring in the management plan, including process-based indicators for assessing the quality of implementation.

The outcome-based indicators should be related to the impact of the fishery so that its value is altered if the fishery impact changes. Some examples of criteria that could be used for defining indicators at different levels reflecting economic, social, institutional and ecological EAF dimensions are provided in Table 3 in Part II, Section 3.

Indicators should deliver meaningful information on results, achievements and performance. They need to be based on data and the means for collecting information and the cost implications should be taken into consideration when designing the monitoring system (see also Part I, Section 2 on information for EAF). If a large number of indicators are suggested, reflecting the priorities of different stakeholder groups, these need to be assessed and a selection made as to which are the most pertinent ones. Particularly in data poor situations, the number of indicators should be restricted to a few effective ones based on defined criteria (see Box 22).

Monitoring and review should take place at regular intervals to systematically compare the current situation, and what has been achieved to date, with the reference points defined for each indicator. An EAF would typically include both continuous monitoring and short-term and long-term review and evaluation cycles. The monitoring and review/evaluation processes should include mechanisms for reassessing and redefining policy goals and management objectives and measures as required in accordance with the adaptive management approach.

Box 22
Check-list for EAF indicator development

- Verify that goals, objectives and targets are clearly defined in the relevant EAF policy and management plan documents.
- Collect information on already existing monitoring programs in the EAF area (e.g. for who, what, where, when, how often, using what methods) and identify potential overlaps and synergies with the proposed EAF monitoring system.
- Determine how indicators should be selected (e.g., based on parameters already being monitored, scientifically sound parameters, parameters allowing for participatory monitoring).
- Develop a list of potential indicators.
- Select indicators considering the following criteria:
    - Policy priorities;
    - Practicality/feasibility;
    - Data availability;
    - Cost-effectiveness;
    - Understandability;
    - Accuracy and precision;
    - Robustness to uncertainty;
    - Scientific validity;
    - Acceptability to users/stakeholders (consensus among parties);
    - Ability to communicate information;
    - Timeliness;
    - Formal (legal) foundation; and
    - Adequate documentation.
- Develop or revise monitoring plans to incorporate selected indicators.
- Design and implement a data management plan.

Sources: Adapted from United States Environmental Protection Agency. 2008. Indicator Development Checklist. *In*: Indicator development for estuaries: EPA-842-B-07-004 (available at www.epa.gov/nep/indicators/pdf/5summ-ref.pdf). FAO. 1999. Indicators for sustainable development of marine capture fisheries. *Technical Guidelines for Responsible Fisheries* No. 8. Rome, FAO. 68p.

7. FUTURE DEVELOPMENTS

The move from conventional fisheries management practices to an ecosystem approach is a paradigm shift that is also seen in other natural resource sectors. There is a growing recognition of the need to improve on narrow management of individual resources and their uses to ensure a long-

term sustainable flow of goods and services from these resources. This has led to increased cross-sectoral collaboration and an increasing number of ecosystem focused initiatives. In the fisheries sector, EAF has become generally accepted, remodelling the conventional fisheries management concept into a more holistic, participatory and ecosystem conscious approach.

A growing world population, technology advances and economic development contribute to increased human pressure on many increasingly scarce resources. Humans play a greater than ever role in environmental degradation and the destabilization of ecosystems. Future human well-being will depend on a reversal of this trend and the successful management of human activities.

Paradigm shifts take time and implementation of new approaches requires the development of new tools and methodologies. The FAO Fisheries and Aquaculture Department has, with these Guidelines, attempted to provide an overview of the current understanding of the human dimensions of implementing the EAF including an outline of social, economic and institutional considerations and approaches valid to EAF. However, the application of the EAF is still in an early stage and, as the wealth of experience from implementing EAF grows, the knowledge on the effectiveness of different approaches and methodologies will also increase. Moreover, as more thought is given to EAF and lessons are learned from experience with its application, the areas in which further human dimensions information is required will evolve. Examples of issues that are likely to attract increased research interest in the future include:

- use of complex adaptive systems concepts for governance at large marine ecosystem scales;
- how to address equity issues in the implementation of EAF so as to reduce conflict;
- what are the social and institutional frameworks needed for adaptive change;
- what are the human interventions and uses that constitute "ecosystem manipulation";
- decision-making under uncertainty (both physical/biological and human); and
- New mechanisms for communication and interaction among stakeholders to explore options in multiobjective situations where interests are different and perhaps conflicting.

The FAO Fisheries and Aquaculture Department is also in the process of developing a set of practical approaches and methods in support of EAF implementation. At the time of publishing the present guidelines, these tools were still in the early stages of development but it is expected that a first

Web-based "EAF toolbox" will be made available during 2009. Furthermore, a detailed review of indicators useful for monitoring ecological, socio-economic and governance issues under an EAF will be completed and made available in 2009. In the meantime, some process methodologies and information management tools are included in the *FAO Fisheries Technical Paper* No. 489.

These Guidelines should hence be considered a work in progress, which can be expanded, altered and complemented in the future.

GLOSSARY

Adaptive management

Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Its most effective form–"active" adaptive management–employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed.

Source: Ministry of Forestry, Government of British Columbia, Canada, webpage (www.for.gov.bc.ca/hfp/amhome/Amdefs.htm).

Agenda 21

A comprehensive plan of action to be implemented at the global, regional, national and local levels by States, international organizations, both inter-governmental and non-governmental, and major stakeholders in every area in which human impacts on the environment. Agenda 21 and the Rio Declaration on Environment and Development, and the Statement of Principles for the Sustainable Management of Forests were adopted by more than 178 Governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil (3-14 June 1992).

Source: Adapted from FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Biological diversity or biodiversity

The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. Diversity indices are measures of richness (the number of species in a system), of evenness (variances of species' local abundance) or of a combination of both. They are therefore indifferent to species substitutions that may result from fishing.

Source: FAO. 1997. Fisheries management. FAO Technical Guidelines for Responsible Fisheries No 4. Rome, FAO. 82p.

Bycatch

Species taken in a fishery that is targeting other species or a different size range of the same species. That part of the bycatch with no economic value is discarded and returned to the sea, usually dead or dying.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4. Suppl. 2. Rome, FAO. 112p.

Co-management

A process of (resource) management in which government shares power with resource users, with each given specific rights and responsibilities relating to information and decision-making.

Source: FAO Fisheries Glossary (www.fao.org/fi/glossary/default.asp) based on OECD (1996), Synthesis report for the study on the economic aspects of the management of marine living resources. AGR/FI(96)12.

Discards

The components of a fish stock that are thrown back into the habitat after capture. Normally, most of the discards can be assumed not to survive.

Source: FAO. 2003 Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Ecosystem

An organizational unit consisting of an aggregation of plants, animals (including humans) and micro-organisms, along with non-living components of the environment.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4. Suppl. 2. Rome, FAO. 112p.

The variability among living organisms from all sources and the ecological complexes of which they are part.

Source: CBD. 1994. Convention on Biological Diversity. Interim Secretariat for the Convention on Biological Diversity. Chatelaine, Switzerland., 34p.

Ecosystem approach (EA)

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

Source: CBD. 2000. Convention on Biological Diversity. Conference of the Parties 5 Decision. 2000. www.cbd.int/ecosystem/

Ecosystem services

The conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life. Examples include provision of clean water and food (fishery resources), maintenance of liveable climates (carbon sequestration), pollination of crops and native vegetation, and fulfilment of people's cultural, spiritual, intellectual needs.

Source: Adapted from FAO/Netherlands International Conference. 2005. Water for food and ecosystems. Glossary. The Hague, The Netherlands, 31 January 2005. (available at www.fao.org/ag/wfe2005/glossary_en.htm).

Fisheries management

The integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives.

Source: Cochrane, K.L. (ed.). 2002. A fishery manager's guidebook - Management measures and their application. FAO Fisheries Technical Paper No. 424. Rome. 231p.

Fish stock (fishery resource)

The living resources in the community or population from which catches are taken in a fishery. Use of the term "fish stock" usually implies that the particular population is more or less isolated reproductively from other stocks of the same species and is thus self-sustaining. In a particular fishery, the fish stock may be one or several species of fish, but the definition is also intended to include commercial invertebrates and plants.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Gender

The relations between men and women, both perceptual and material. Gender is not determined biologically, as a result of sexual characteristics of either women or men, but is constructed socially. It is a central organizing principle of societies, and often governs the processes of production and reproduction, consumption and distribution.

Source: FAO, 1997. Gender: the key to sustainability and food security. SD Dimensions. May 1997 (www.fao.org/sd).

Governance

The formal and informal arrangements, institutions, and mores which determine how resources or an environment are utilized; how problems and opportunities are evaluated and analysed, what behavior is deemed acceptable or forbidden, and what rules and sanctions are applied to affect the pattern of resource and environmental use.

Source: Juda, L. 1999. Considerations in the development of a functional approach to the governance of large marine ecosystems. Ocean Dev. Int. Law 30:89-125.

Indicator

A variable, pointer, or index related to a criterion or system attribute. Its fluctuations reveal the variations in those key elements of sustainability in the ecosystem, the fishery resource or the sector and social and economic well-being. The position and trend of an indicator in relation to reference points or values indicate the present state and dynamics of the system, which forms the basis for decision-making.

Source: FAO. 1999. Indicators for sustainable development of marine capture fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 8. Rome, FAO. 68p.

Integrated management

Integrated management (whether of oceans, coasts, watersheds, etc) is an approach, or mechanism, to manage multiple (competing) uses of a certain designated area. These uses include different sectors such as fisheries, aquaculture, forestry, oil and gas, mining, agriculture, shipping and tourism. This involves managing multiple stakeholders (e.g. local communities and industries) as well as interactions among people and other components of ecosystems, and among multiple levels of government.

Source: De Young, C., Charles, A. and Hjort, A. 2008. Human dimensions of the ecosystem approach to fisheries: an overview of context, concepts, tools, and methods. FAO Fisheries Technical Paper No. 489. Rome, FAO. 152p.

Livelihood

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living.

Source: DFID, 1999. Sustainable livelihoods guidance sheets (www.livelihoods.org/info/guidance_sheets_pdfs/section1.pdf). Based on Chambers, R. and G. Conway, 1992. Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Brighton, IDS.

Management

The art of taking measures affecting a resource and its exploitation with a view to achieving certain objectives, such as the maximization of the production of that resource.

Source: Cooke, J.G. 1984. Glossary of technical terms. In Exploitation of Marine Communities, R.M. May (ed), Springer-Verlag. Cited in FAO Fisheries Glossary (www.fao.org/fi/glossary/)

Management measure

Specific controls applied in the fishery to contribute to achieving objectives, including technical measures (gear regulations, closed areas and time closures), input controls, output controls and user rights.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Marine protected area (MPA)

A protected marine intertidal or subtidal area, within territorial waters, exclusive economic zones (EEZ) or in the high seas, set aside by law or other effective means, together with the overlying water and associated flora, fauna, historical and cultural features. It provides degrees of preservation and protection for important marine biodiversity and resources; a particular habitat (e.g. a mangrove or a reef) or species, or subpopulation (e.g. spawners or juveniles) depending on the degree of use permitted. The use of MPAs for scientific, educational, recreational, extractive and other purposes including fishing is strictly regulated and could be prohibited.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Monitoring, control and surveillance (MCS)

Activities undertaken by the fishery enforcement system to ensure compliance with fishery regulations.

Source: FAO Fisheries Glossary (www.fao.org/fi/glossary/default.asp)

Open access

A condition describing a fishery that is open to anyone who wants to fish.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Policy goal

High-level policy objective relating to fish resources, ecosystems (e.g. biodiversity), economics and social benefits, usually at a specified regional or national level.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Reference point

A reference point indicates a particular state of a fisheries indicator corresponding to a situation considered as desirable ("target reference point"), or undesirable and requiring immediate action ("limit reference point" and "threshold reference point"). Also referred to as "reference value".

Source: Caddy, J.F. and Mahon, R. 1995. Reference points for fisheries management. FAO Fisheries Technical Paper No. 347. Rome, FAO. 82p.

Resilience

Resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.

Source: Walker, B., Holling, C.S., Carpenter, S.R., and Kinzig, A. 2004. Resilience, adaptability and transformability in social -ecological systems. Ecology and Society 9(2):5. www.ecologyandsociety.org/vol9/iss2/art5/

Rights-based management

A fisheries management regime in which access to the fishery is controlled by use rights that may include not only the right to fish but also management rights specifying any or all of the following: how fishing may be conducted (e.g. vessel and gear), where and when fishing may take place and how much fish may be caught.

Source: Adapted from FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Scale

In ecosystem management, scale refers to the degree of resolution at which ecosystems are observed and measured. In EAF, scales at different dimensions need to be considered, i.e. based on, *inter alia,* geographical area (e.g. global, regional, national or local), sectoral activities (e.g. individual fishery, fishery system at various geographical levels or cross-sectoral to include other uses and activities within an ecosystem) and administrative levels (e.g. national government, sectoral department, local administration).

Sources: Adapted from US Forest Service. 2009. Bitterroot Ecosystem Management Research Project. Glossary. www.fs.fed.us/rm/ecopartner/bemrp_glossary.shtml and
FAO. 1999. Indicators for sustainable development of marine capture fisheries. FAO Technical Guidelines for Responsible Fisheries No. 8. Rome, FAO. 68p.

Social-ecological systems

Social-ecological systems are linked systems of people and nature, i.e. where human societies and the biophysical components of ecosystems are interconnected, in which changes in one will affect the other and create feedback. In EAF, an ecosystem is defined as social-ecological system, i.e. including both human and nature.

Sources: Stockholm Resilience Centre (www.stockholmresilience.org) and Guerin, K. 2007. Adaptive Governance and Evolving Solutions to Natural Resource Conflicts. NZ Treasury Working Paper 07/03. Government of New Zealand (http://newzealand.govt.nz).

Stakeholder

Any individual, group, organization or sector in society that has a clearly identifiable interest in the outcome of a policy or decision-making situation. The interest may be in the form of a specific management responsibility, a commercial interest (resource supply, revenue, employment, trading activity), a subsistence need or some other commitment, as a member of civil society.

Source: FAO. 1999. Indicators for sustainable development of marine capture fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 8. Rome, FAO. 68p.

Sustainability

Ability to persist in the long-term. Often used as a "short hand" for sustainable development.

Source: FAO Fisheries Glossary (www.fao.org/fi/glossary/default.asp)

Sustainable development

Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

Source: World Commission on Environment and Development. 1987. Brundtland Report, "Our Common Future".

Sustainable livelihoods

A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

Source: DFID. 1999. Sustainable livelihoods guidance sheets (www.livelihoods.org/info/guidance_sheets_pdfs/section1.pdf). Based on Chambers, R. and G. Conway, 1992. Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Brighton, IDS.

Sustainable Livelihoods Approach (SLA)

The SLA is a way to improve understanding of the livelihoods of poor people. It draws on the main factors that affect poor people's livelihoods and the typical relationships between these factors. It can be used in planning new development activities and in assessing the contribution that existing activities have made to sustaining livelihoods. People are the main concern, rather than the resources they use or their governments. SLA is used to identify the main constraints and opportunities faced by poor people, as expressed by themselves. It builds on these definitions, and then supports poor people as they address the constraints, or take advantage of opportunities.

Source: www.ifad.org/sla/index.htm

Target-resource oriented management (TROM)

A term constructed to refer to conventional fisheries management practices, commonly applied in medium and large-scale commercial fisheries, in which the stock of the target species is the man concern of the management actions.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Target species

Those species that are primarily sought by the fishermen in a particular fishery. The subject of directed fishing effort in a fishery. There may be primary as well as secondary target species.

Source: FAO. 2003. Fisheries management 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 112p.

Vulnerability

A condition resulting from physical, social, economic, and environmental factors or processes, which increases the susceptibility of a community to the impact of a hazard.

Source: Asian Disaster Reduction Center. Total disaster risk management good practices. January 2005. Kobe, Japan.
www.adrc.or.jp/publications/TDRM2005/TDRM_Good_Practices/PDF/

These Guidelines have been developed in response to requests for further information on the practical adoption and application of the ecosystem approach to fisheries (EAF), with a special focus on its human dimensions. As implementation of EAF is a human pursuit and takes place in the context of societal goals and aspirations, the human forces at play need to be understood and considered – these include policies, legal frameworks, social structures, cultural values, economic principles, institutional processes and any other relevant form or expression of human behaviour. Human dimensions play four main roles in EAF: (1) social, economic and institutional objectives and factors are driving forces behind the need for EAF management; (2) the costs and benefits to individuals and to society of applying the EAF have social, economic and institutional impacts and implications; (3) the application of social, economic and institutional instruments are all crucial for successful implementation of the EAF; and (4) social, economic and institutional factors present in fishery systems can play either supporting or constraining roles in EAF implementation.

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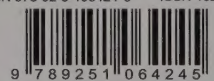

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